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Attached are the references for Serial No. 10/511,523

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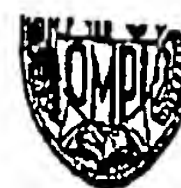
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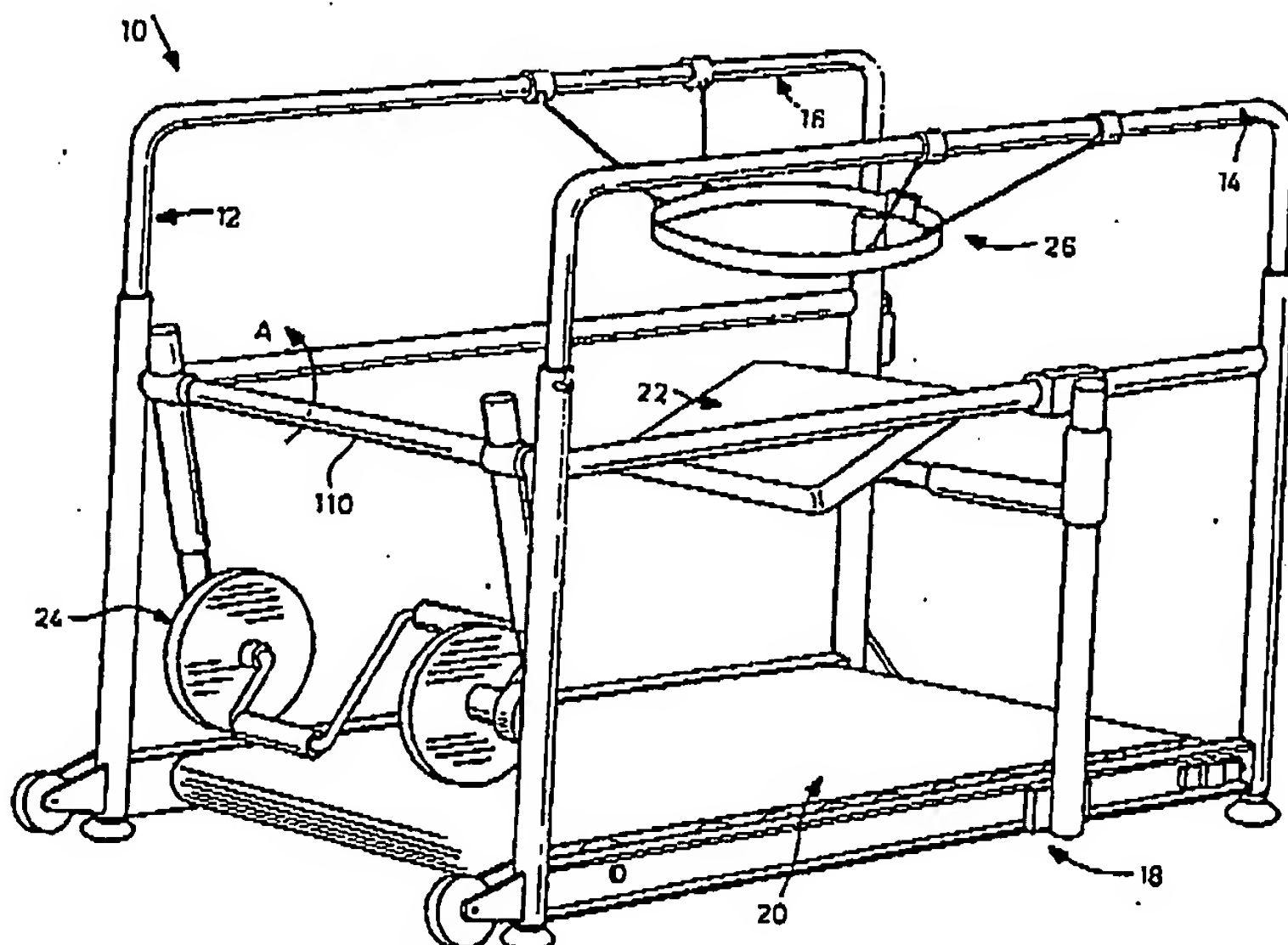
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(21) International Application Number: PCT/US87/01734 (22) International Filing Date: 20 July 1987 (20.07.87) (31) Priority Application Number: 514,110 (32) Priority Date: 18 July 1986 (18.07.86) (33) Priority Country: CA (71) Applicants: CANHART INDUSTRIES INC. [CA/CA]; R.R. #1, Richmond Hill, Ontario L4C 4X7 (CA). O'ROURKE, Thomas, A. [US/US]; 39 Brixton Road, Garden City, NW 11530 (US). (72) Inventors: WARD, Adele, E. ; WARD, J., R., Kingsley, Jr. ; R.R. #1, Richmond Hill, Ontario L4C 4X7 (CA). (74) Agents: O'ROURKE, Thomas, A. et al.; Wyatt, Gerbers, Shoup, Scobey & Badie, 261 Madison Avenue, New York, NY 10016 (US).		(81) Designated States: AT (European patent), AU, BB, BE (European patent), BG, BJ (OAPI patent), BR, CH (OAPI patent), CG (OAPI patent), CH (European pa tent), CM (OAPI patent), DE (European patent), DK FI, FR (European patent), GA (OAPI patent), GI (European patent), HU, IT (European patent), JP KR, LK, LU (European patent), MC, MG, ML (OA PI patent), MR (OAPI patent), MW, NL (Europear patent), NO, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI pa tent). Published <i>With international search report.</i>

(54) Title: EXERCISING DEVICE



(57) Abstract

A self-contained exercising device (10) having an adjustable frame (12) comprising frame sections (14, 16) which extend upward from a treadmill (20) and which is open in the rear area to provide access for a patient. A seat (22) is coupled to the central portion of one of the frame portions and a limb exercising device (24) is coupled to the front portion of the

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TITLE: EXERCISING DEVICE

The invention relates to exercising devices.

The increasing population of geriatric care facilities has increased the awareness of the need for providing physical exercise to the handicapped and other geriatric patients.

Exercising devices generally available in the form of treadmills have been found to be particularly beneficial in maintaining good cardiovascular fitness. However, such treadmill devices have been considered dangerous for use by patients due to the risk of their slipping on or falling from the device. In addition, the frame-like structure which is commonly seen in these treadmills act as a further source of injury.

Other exercising devices are available and are particularly directed to geriatric patients. For example, there is a device utilizing a "bike pedal" configuration, which is fastened to the legs of the patients chair, such that the patient may exercise his legs in a motion analogue to riding a bicycle. However, such devices restrict the patient to one mode of exercise only.

Accordingly, it would be desirable to provide an exercising device which not only incorporates the beneficial effects of the treadmill but also provides the possibility of several modes of exercise to geriatric patients.

Accordingly, it is the object of the present invention to provide a novel form of exercising device.

Briefly stated the invention comprises a self-contained exercising apparatus, comprising:

a base including a treadmill;

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a frame structure having first and second frame portions upwardly extending from the longitudinal edges of the treadmill;

a limb exercising device coupled to the front portion of the frame structure and positionable above the treadmill; and

a seat coupled to the central portion of the frame structure, the seat being orientable to a position adjacent the treadmill and the limb exercising device so as to provide support to the user during use of the treadmill or the limb exercising device.

Further features, objects and advantages of the present invention will be evident from the following detailed description, given by way of example only, with reference to the appended drawings in which:

Figure 1 is a perspective view of an exercising device.

Figure 2 is a side view of the exercising device illustrated in Figure 1.

Figure 3 is a rear view of the exercising device illustrated in Figure 1.

Figure 4 is a sectional view taken on line 4-4 of Figure 2.

Figure 5 is a sectional view taken on line 5-5 of Figure 2.

Figure 6 is a perspective view of a portion of an alternative exercising device.

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Figure 7 is a perspective view of another element of an alternative exercising device.

Figure 8 is a frontal view of a portion of the element shown in Figure 7.

Referring now to Figure 1, the exercising device 10 has an adjustable frame 12 formed from left and right frame sections 14, 16 respectively. The frame sections 14, 16 upwardly extend from a base 18, which is defined by a treadmill 20, and is open in the rear area to provide access for the patient to the treadmill. A seat 22 is provided in the central region of the frame and is swingable to a stored position along the frame 12. In addition, a limb exerciser 24 is pivotally mounted to the front section of the frame 12. The exerciser is further provided with a harness 26 to provide support to the patient.

Referring now to Figures 2 and 3, each of the left and right frame sections 14, 16 has a lower part formed from a front and rear vertical members 28, 30 respectively with a horizontal member 32 spanning the area between the vertical members 28, 30. The vertical members 28, 30 are further fastened at their lower ends to a channel member 34. The frame also has footings 36 to provide a solid base to accommodate any structural variations in the frame 12 or irregularities on the floor surface identified at 38.

The device is portable by way of rollers 40 forwardly extending from the front vertical members 28. In addition, handles 42 are pivotally mounted to the rear vertical members 30, enabling the device to be lifted, thereby transferring the device 10 from the footings 36 to the rollers 40.

The upper ends 28a, 30a of the front and rear vertical members respectively are open to receive the parallel

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ends 44a of a handle bar 44 slidably inserted therein. The bar 44 is made adjustable within the upper ends 28a, 30a by way of a number of threaded bores 44b formed longitudinally on the ends 44a and co-axial with bores 28b, 30b located in the vertical members 38, 40 respectively to receive adjustment pins 46.

The seat 22 is mounted on a seat frame 48 having a vertical seat member 50 joining the channel member 34 with the horizontal member 32 by brackets 52 and 54 respectively. A sleeve 56 is slidable and rotatable on the vertical seat member 50 and is joined to the outer element 58 of a pair of telescoping elements. The inner element 60 has a seat bracket 62 mounted thereon, with the seat 22 connected to the bracket by way of a number of projections 64 depending from the bottom surface of the seat 22. The brackets 62 and projections 64 also have co-axial bores 62a, 64a respectively to receive a pair of pins 66. In addition, a releasable pin 57 is provided in sleeve 56 to extend through bore 56a and bores 50a or 50b to maintain the sleeve alternatively in an operable position shown in solid lines or a stored position shown in dashed lines in Figure 2.

Alternatively, the sleeve 56 may be adjustably mounted on the vertical seat member 50 to accommodate patients with a range of different leg lengths.

The channel members 34 also provide support for the rollers 68 of the treadmill 20, which are spaced along and rollable with respect to the channel members 34. A continuous belt 70 travels along the periphery of the rollers 68 and have longitudinal travelling limits defined by a pair of front and rear anchor rollers 72, 74 respectively. The rear roller 74 is supported on a roller frame 74a to adjust belt tension. This is provided by a bolt 74b extending through the rear vertical member 30 and being threadably engaged with the roller frame

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74a, such that rotation of the bolt 74b results in the axis of the roller 74 being displaced along the channel member 34.

The front roller 72 has a brake assembly 76 to provide resistance against motion of the belt 70. As seen in Figure 4, the brake assembly 76 has an adjustment handle 78 threaded to a flange portion 80, which in turn is bolted to a brake housing 82 by bolts 84. The brake housing 82 is also mounted to a plate member 86, with the plate member 86 being bolted to the channel member 34 by bolts 88. A compression spring 90 is interposed of the handle 78 and a first brake disc 92. A second brake disc 94 is interposed of the first brake disc 92 and the brake housing 82, with brake pads 96, 98 defined between the contacting surfaces between the respective brake discs 92, 94 and the brake housing 82. The second brake disc 94 is keyed to a shaft 100, with the shaft fixed to the roller 72 by way of a key 102 and supported on a bearing 104 mounted in the channel by bolts 106. In this manner, rotation of the handle 78 increases the compressive force against the second brake disc 94, which results in an increased resistance to rotation being applied to the roller 72.

The limb exerciser 24 is pivotally mounted on the front vertical members 28 by a support structure 108 having a cross member 110 extending between the front vertical members 28. As seen in Figure 4, each end of the cross member is formed by a shaft 112 extending through bores 28c in the vertical member 28. A one-way ratchet 114 mechanism couples the shaft with the vertical member to provide rotation of the cross member in one direction as identified by arrow "A".

Referring to Figure 3, a boss 116 is mounted on each end of the cross member, to which laterally extends the outer tube 118 of a pair of telescoping tubes. The inner tube 120 extends outwardly from the inner tube and has a remote end 120a provided with a transverse passage 120b. The passage receives

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a shaft portion 122 of a crank assembly 124, rotatable therein by way of bushings 126.

The crank mechanism has a pair of cranks 124a, 124b joined in tandem along the common axis defined by the shaft portions 122. The crank mechanism 124 also has a pair of fly wheels 126 to assist the user in obtaining a steady rotation of the cranks 124a, 124b. The crank mechanism 124 also includes a pair of brake assemblies 128, having the same structural characteristic as brake assembly 76, including a handle 130 to provide adjustable resistance to rotation.

The pivotal connection of the limb exerciser 24 with the frame 12 enables the limb exerciser 24 to be rotated to any one of a number of positions, some being indicated at "B", "C" and "D" shown in Figure 2. In this manner, the limb exerciser 24 is workable by both the feet and the hands. Also, the rotational capability of the limb exerciser support structure 108 and the extensible capability of the telescoping tubes 118, 120 enables the exerciser to accommodate a number of users with different body sizes. The seat also aids to this body size accommodation while providing support to the patient during use of both the treadmill and the limb exerciser.

Support of the patient is also assisted by way of the harness 26 coupled to the handle bars 44. The harness 26 has a belt 134 with a rearwardly located buckle 134a, and four elastic straps 136 coupled to the belt and the handle bars by brackets 138, 140 respectively.

In this manner, the belt 134 may be attached to the central region of the user while the elastic straps 136 enable the user to generate the exercising device in either of a standing or seated position.

In operating the device, the user enters the device from the rear access between the rear vertical members 30. The

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seat may then be moved from the stored position to the operable position and the limb exercising device 24 rotated to either an arm exercising position or a leg exercising position.

The user may then attach the belt around his waist area to receive added support, for his subsequent exercising activity, involving the treadmill 20 and the limb exerciser 24.

In operating the treadmill 20, the belt 70 is displaced along the rollers 68, by use of the legs and feet in a walking movement. The limb exerciser 24 may be operated simultaneously with the treadmill 20 by rotating the cranks 124a, 124b with the arms or alternatively by the feet. In this case, the cranks 124a, 124b may be provided with a harness to hold the feet against the cranks, for example a pair of releasable straps 125.

An alternative embodiment is shown in Figure 6 wherein an arm rest assembly 150 is removably mounted to the handle bars 44 by way of brackets 152 each of which is releasable by way of knobs 152a which hold hinged portion 152b against the lower surface of handle bar 44. Upwardly extending from the brackets 152 are tubular members 154 which terminate at a "U"-shaped member 156. Mounted on the rear top surface of the "U"-shaped member 156 are arm pads 158, each to receive a lower arm region of the user. Mounted upwardly on the "U"-shaped member in front to the arm pad 158 are handle grips 160 providing the user with additional support.

In addition, the front region 156a of the "U"-shaped member 156 acts as a further protective abutment and may be covered with a pad as shown at 161, to protect against injuries caused by bodily contact with the limb exerciser 24.

A further alternative is shown in Figures 7 and 8, wherein the exercising device 10 is provided with a knee

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support 162 comprising a frame 163 mounting a cushion 164 in an angular upward orientation above the treadmill 20.

The support is mounted on one of the front vertical members 28 by way of a transverse passageway 166 formed therein. As may be seen in Figure 7, the frame 162 includes a shaft element 168 extending through the passageway 166 and fixed to a tubular element 170 at one end and a one-way ratchet mechanism 172 at the other by way of a key 173, the one-way ratchet mechanism being of the same type as one-way ratchet mechanism 114.

The tubular element 170 extends horizontally inward from the front vertical member 28 and having fixed at its remote end 170a, a transverse tubular element 174. The transverse tubular element 174 is telescopingly engaged with another tubular element 176, which outwardly extends from the tubular element 174 to terminate at a cushion bracket 178 pivotally mounted thereto by pivot pin 180, the cushion bracket 178 is pivotably adjustable on tubular element 176 by way of a release bolt 182 threaded in bore 176a therein, the release bolt 182 also located in arcuate slots 178a formed in bracket 178. In addition, tubular element 176 is releasably fixed in tubular element 174 by a release bolt 184 threaded in bore 174a and extending through slots 176b. Thus, the knee support 160 has multiple adjustments to accommodate a varied number of desired positions for the user.

Alternative arrangements are also considered for harness assembly 26 including six or more straps 136 to provide further support to the user. Also contemplated is the use of different types of straps 136 such that the front straps have a different spring constant than the rear straps, thereby providing easier flexibility of the harness in the one direction than in the other. For example, the use of a higher spring constant in the front pair of straps 134 enables the user to flex the harness 26 in the forward direction, while

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having reduced flexibility in the rearward direction, thereby preventing the user from contacting the frames 12 or the treadmill 20 and causing injury.

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CLAIMS

1) A self-contained exercising apparatus, comprising:

a base including a treadmill;

a frame structure having first and second frame portions upwardly extending from the longitudinal edges of said treadmill;

a limb exercising device coupled to the front portion of said frame structure; and

a seat coupled to the central portion of one of said frame portions.

2) An exercising device as defined in claim 1 wherein the seat is swingingly mounted to said one of said frame portions.

3) An exercising device as defined in claim 2, wherein the seat includes an extensible seat frame.

4) An exercising device as defined in claim 3 wherein said extensible seat frame includes a vertically adjustable frame portion.

5) An exercising device as defined in claim 5 wherein said vertically adjustable frame portion includes a substantially vertically oriented first elongate member with a sleeve member slidably engaged on the outer surface thereof, the seat being coupled with said sleeve member and including locking means for locking the sleeve member in a desired position.

6) An exercising device as defined in claim 5 wherein said extensible seat frame includes second and third elongate

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members, said second and third members being telescopingly engaged with the outer of said members being coupled to said sleeve member.

7) An exercising device as defined in claim 1 wherein a portion of the frame structure is vertically adjustable.

8) An exercising device as defined in claim 7 wherein each of the first and second frame portions include a first pair of upwardly oriented elongate elements, with which respectively slidably engage, a second pair of elongate elements.

9) An exercising device as defined in claim 8 wherein said first pair of elongate elements are substantially parallel and said second pair of elongate elements form the depending portions of a handle bar member.

10) An exercising device as defined in claim 1 wherein the limb exercising device is pivotally coupled in the front region of each of said first and second frame portions so as to provide adjustable orientation of the limb exercising device for alternate access by the hands and feet of the user.

11) An exercising device as defined in claim 10 wherein the limb exercising device includes a pair of extensible frame members.

12) An exercising device as defined in claim 11 wherein each of said extensible members is formed from first and second elongate elements with said first elongate element slidably telescopingly engaged with said second elongate element.

13) An exercising device as defined in claim 12 wherein the limb exercising device includes a crank mechanism having a crank rotatably coupled with said first elongate elements.

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- 14) An exercising device as defined in claim 13 wherein the crank mechanism includes braking means to apply resistance to rotation of the crank mechanism.
- 15) An exercising device as defined in claim 1, further comprising a harness assembly to support the user.
- 16) An exercising device as defined in claim 15 wherein the harness assembly includes a belt element wrappable around the central region of the user and coupled with said first and second frame portions so as to support the user in both a standing and a sitting position.
- 17) An exercising device as defined in claim 16 wherein said harness assembly includes a pair of extensible links joining said belt element with said first and second frame portions.
- 18) An exercising device as defined in claim 1 wherein the device is positioned on footings located in the corners of the base, a handle means is located at the rear of the first and second frame portions, rolling elements disposed in close proximity with the ground in the front region of the first and second frame portions, whereby rotation of the device relative to the rolling elements provides mobility to the device.
- 19) An exercising device as defined in claim 1 further comprising arm support means coupled with said first and second frame portions to support the arms of the user.
- 20) An exercising device as defined in claim 19 wherein said arm support means includes a support element having a pair of spaced arms oriented in a plane substantially parallel with said treadmill, with said arms extending along said first and second frame portions, said support element further including a spanning member joining the adjacent ends of said pair of arms.

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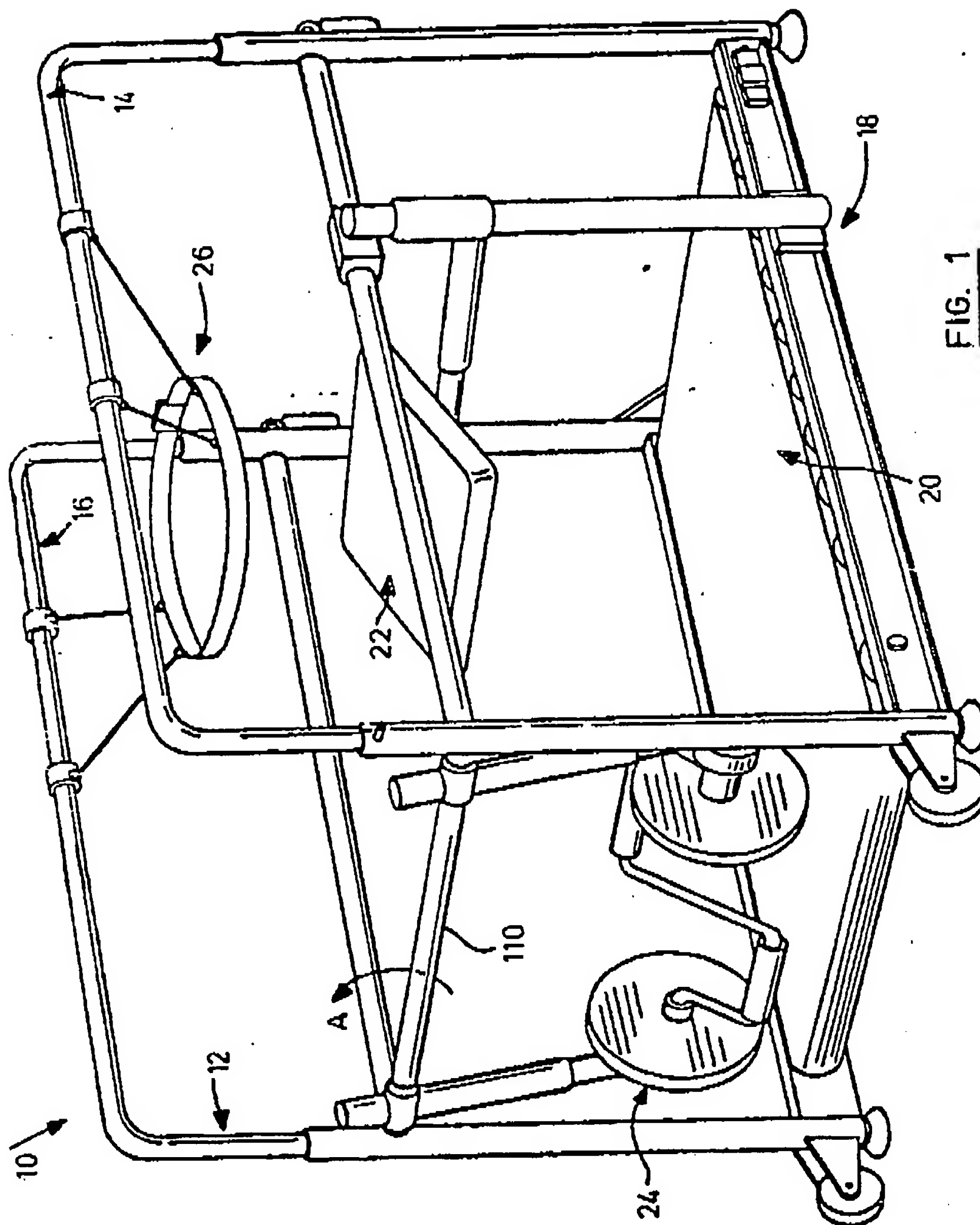
21) An exercising device as defined in claim 1 further comprising a knee support assembly adjustably mounted on one of said frame portions.

22) An exercising device as defined in claim 21 wherein said knee support assembly has a support structure pivotally mounted on one of said frame sections.

23) An exercising device as defined in claim 22 wherein said support structure includes a pair of telescoping members extending into the region between said first and second frame sections.

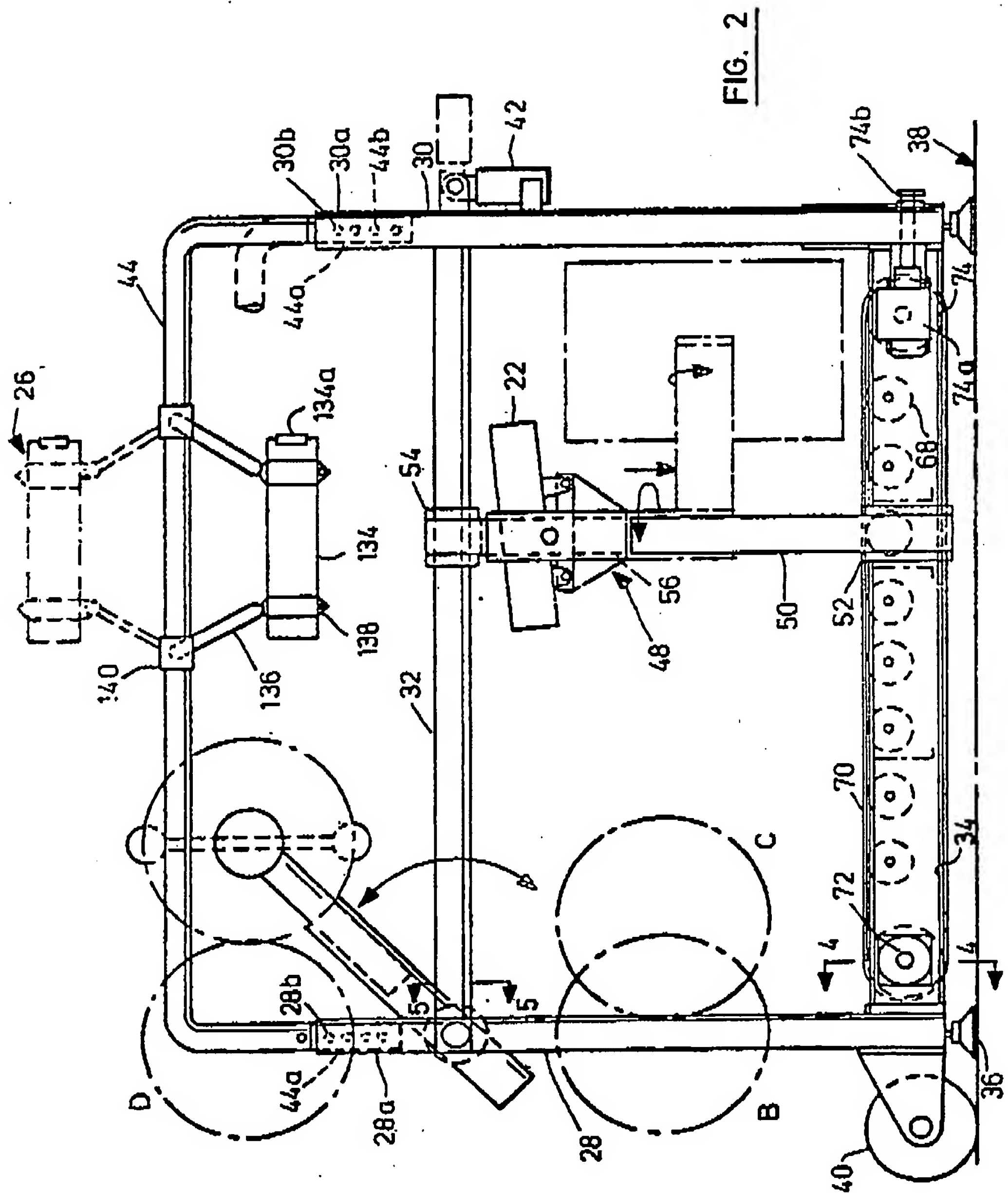
24) An exercising device as defined in claim 23 wherein said telescoping members are fixed to a third member, said third member coupled to said frame section by way of a ratchet mechanism.

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01 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

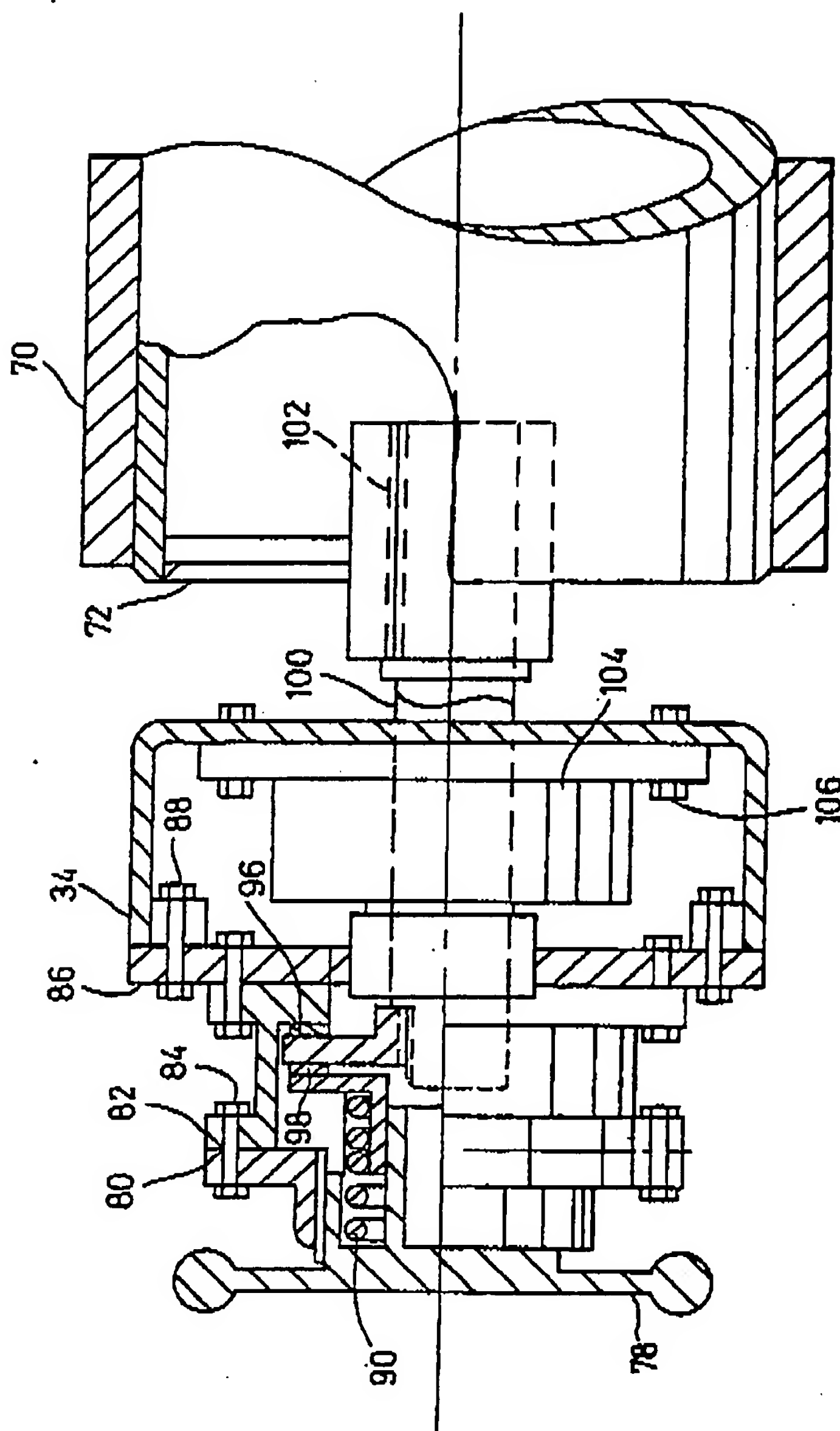


FIG. 4

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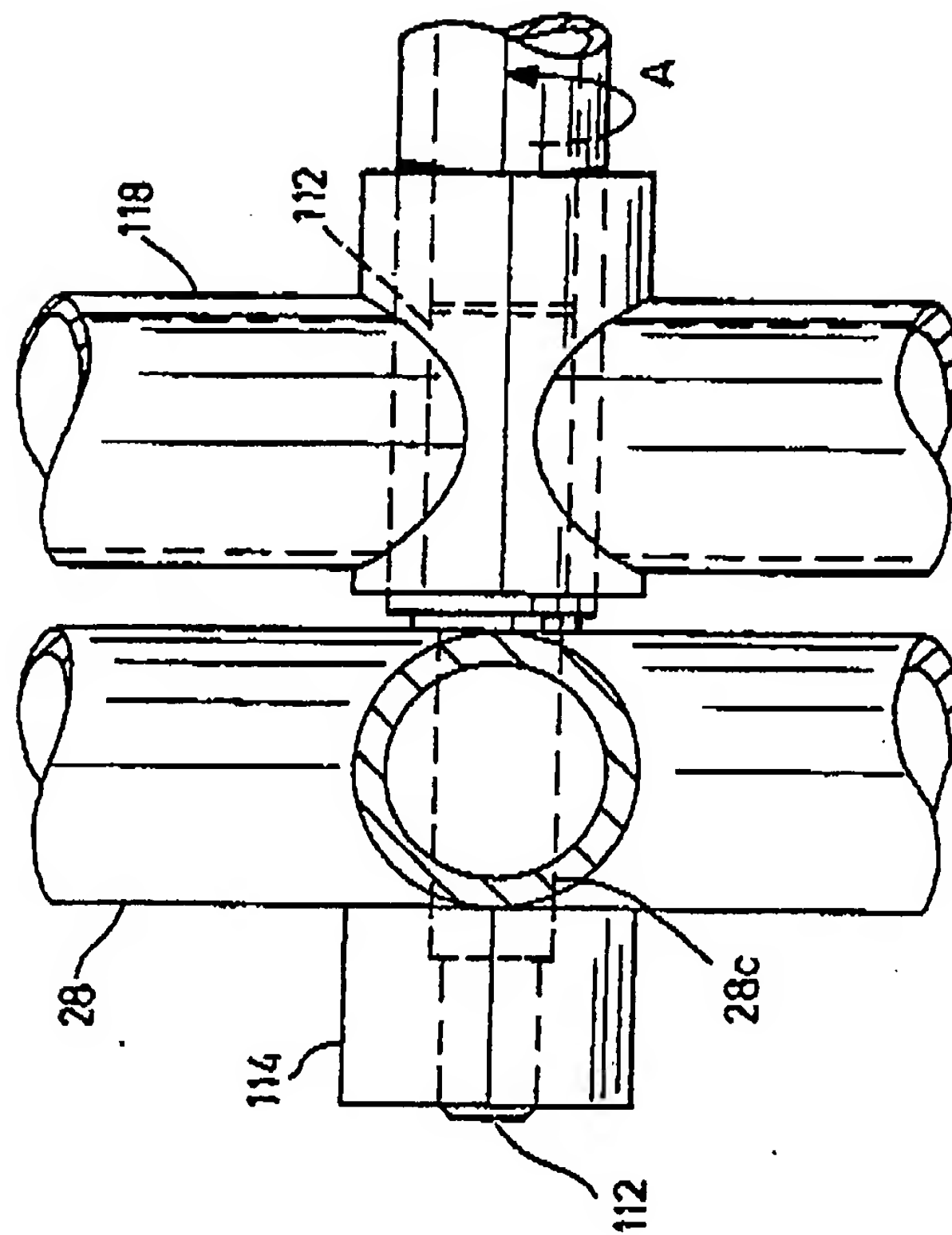


FIG. 5

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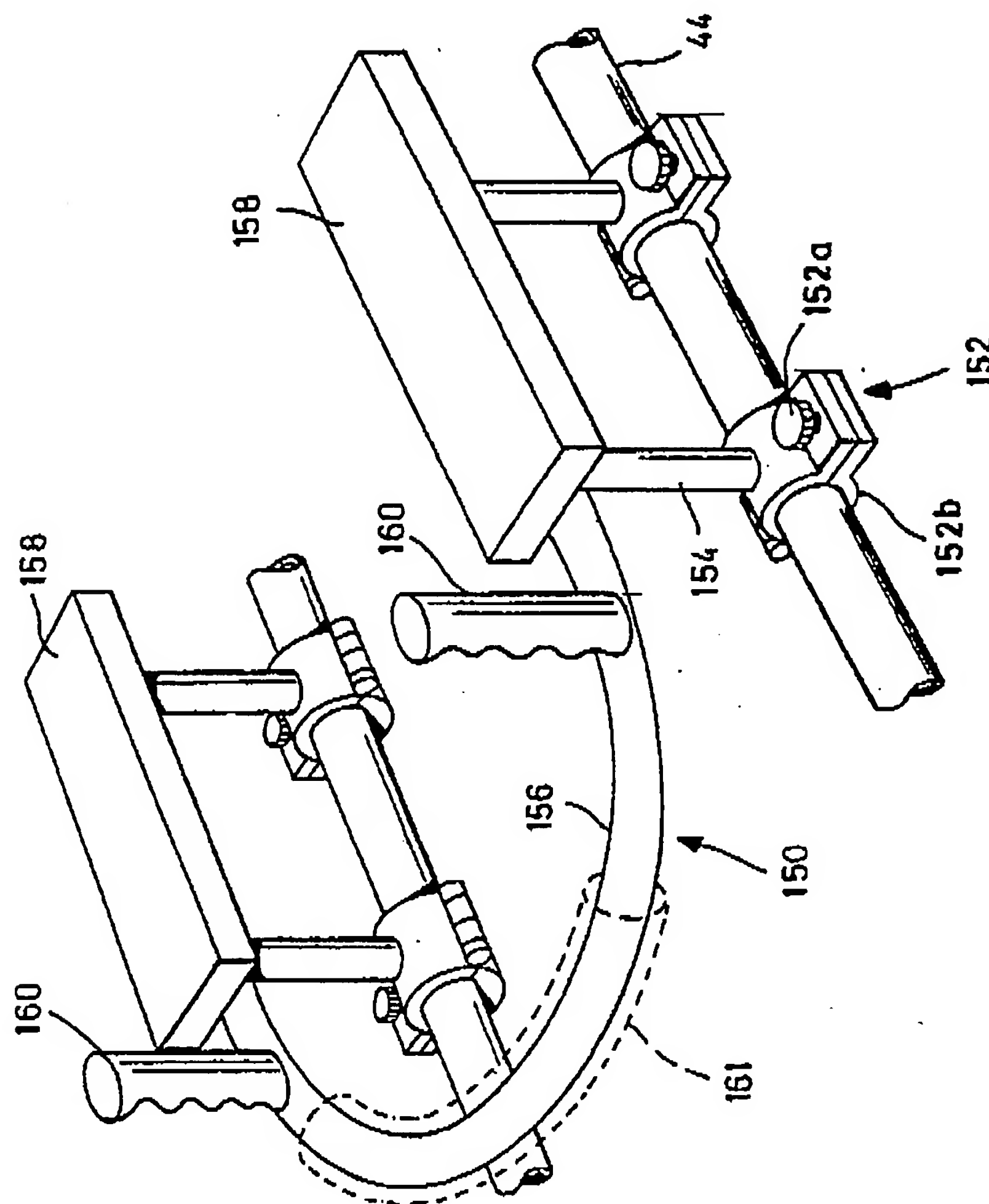


FIG. 6

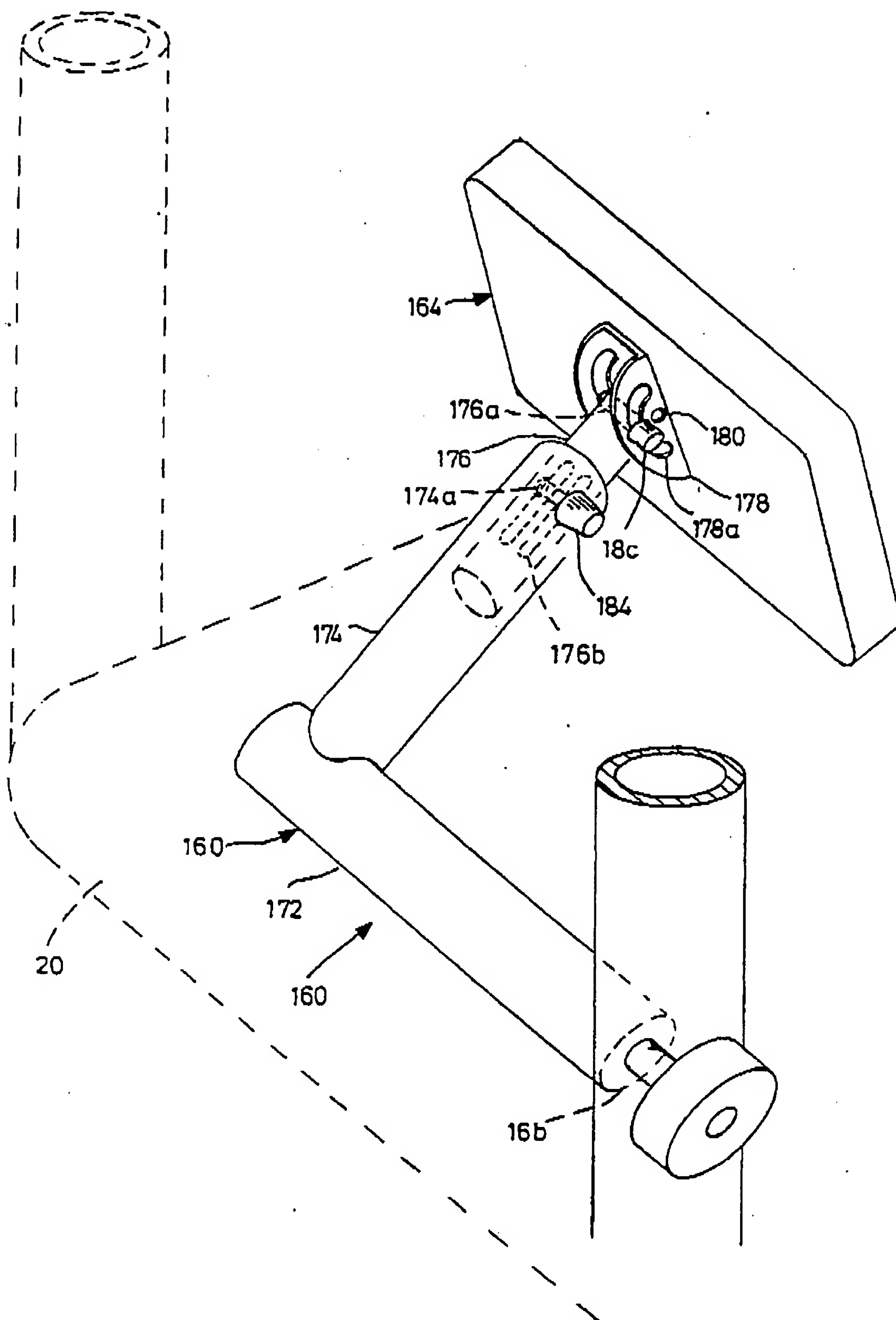


FIG. 7

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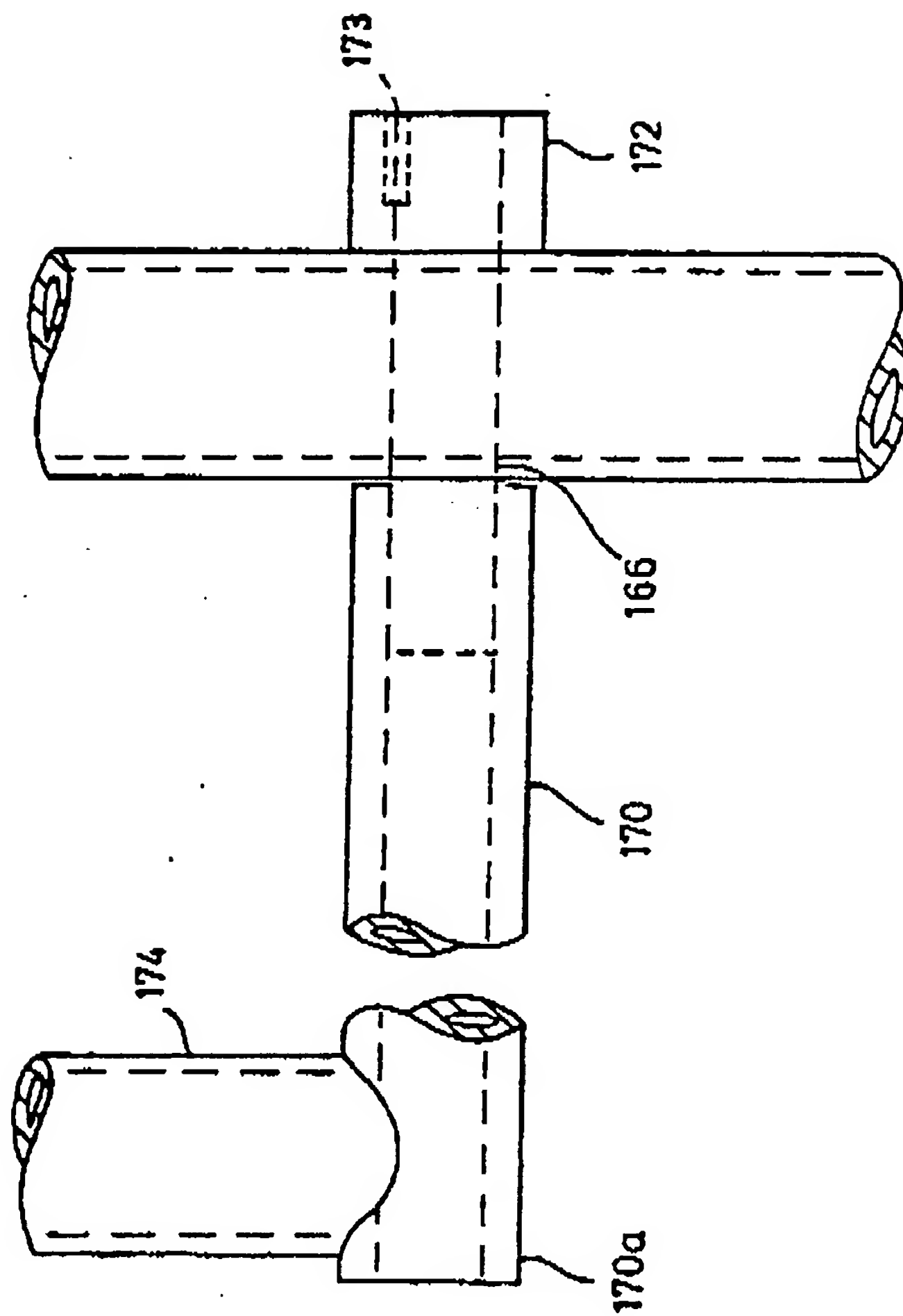


FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No PCT/US87/01734

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC(4): A63B 23/06		
U.S. Cl: 272/69		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
U.S.	272/69, 70, 73 128/25R	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹¹		
Category ⁶	Citation of Document, ¹⁰ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
A	US,A, 4,026,545 (SCHONENBERGER) 31 MAY 1977 See col. 1, lines 59-62; col. 2, lines 55-63	
A	US,A, 4,204,673 (SPEER, SR.) 27 MAY 1980 See col. 2, lines 40-44, 55-68; col. 3, lines 1-8	
A	US,A, 2,399,915 (DRAKE) 07 MAY 1946 See col. 3, lines 40-53; col. 4, lines 19-28; col. 5, lines 48-55	1,15-19
A	US,A, 3,870,297 (ELDER) 11 MARCH 1975 See col. 5, lines 8-65	
Y	CAN,A, 672583 (PRIMEAU) 22 OCTOBER 1963 See page 5, lines 22-28, page 6, lines 1-6	1,7,15,16,19
Y	US,A, 2,826,192 (MANGAS) 11 MARCH 1958 See col. 2, lines 50-53, lines 58-66	1,18,19
<p>¹⁶ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the International filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the International filing date but later than the priority date claimed</p> <p>"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ⁸		Date of Mailing of this International Search Report ⁹
01 OCTOBER 1987		20 OCT 1987
International Searching Authority ¹		Signature of Authorized Officer ²⁰
ISA/US		S.R. Crow <i>AR Crow</i>

International Application No.

PCT/US87/01734

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

A US,A, 4,564,193 (STEWART) 14 JANUARY 1986
See the entire document

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹⁰

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers, because they relate to subject matter ¹² not required to be searched by this Authority, namely:

2. ☐ Claim numbers, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out ¹³, specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ¹¹

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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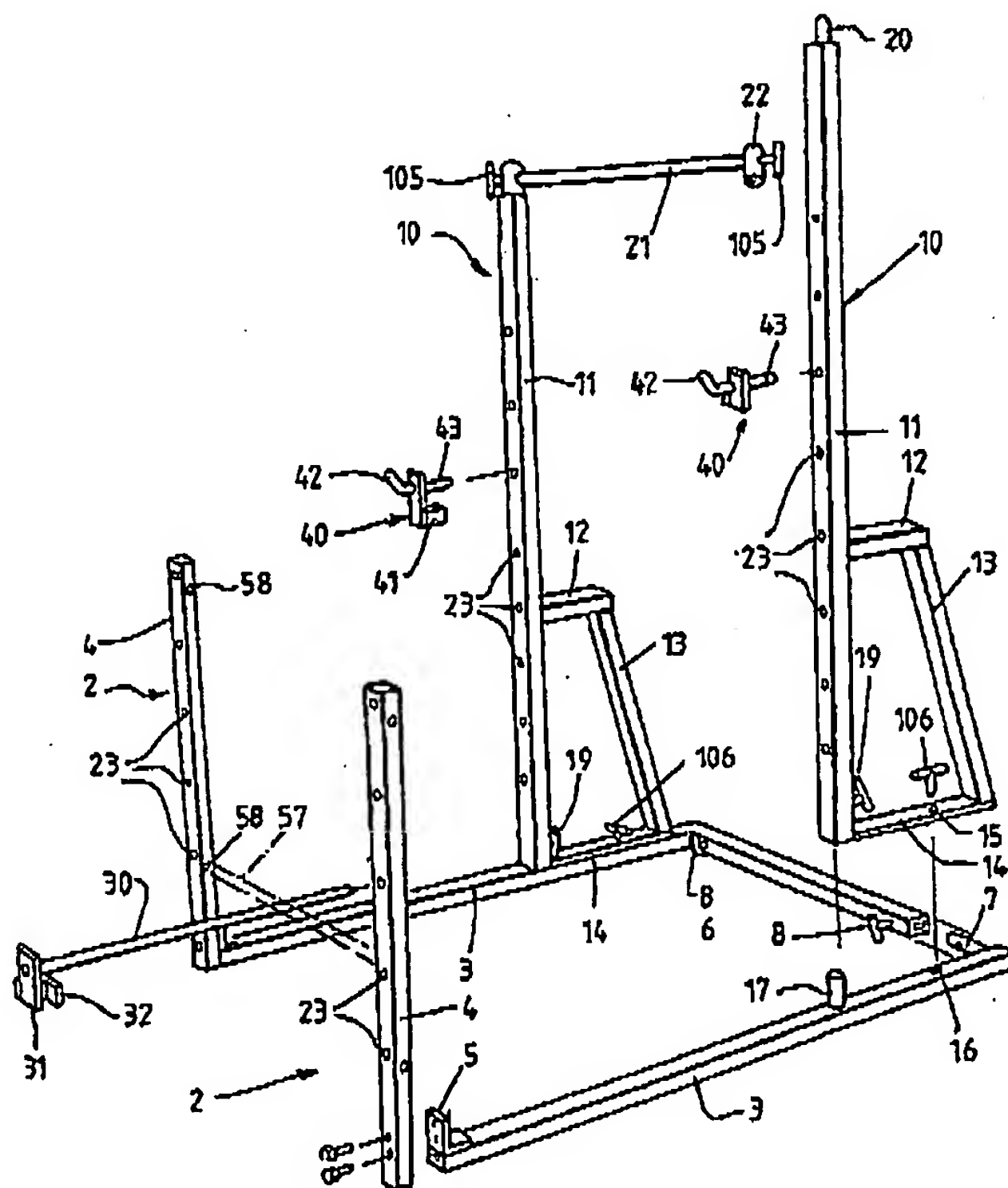
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/AU99/00431 (22) International Filing Date: 4 June 1999 (04.06.99) (30) Priority Data: PP 3927 5 June 1998 (05.06.98) AU (71)(72) Applicants and Inventors: MINNS, Darren, Graeme [AU/AU]; P.O. Box 357, Doncaster, VIC 3108 (AU). ELLIS, Andrew, Bruce [AU/AU]; P.O. Box 357, Doncaster, VIC 3108 (AU). (74) Agent: TATLOCK, Alfred ; A Tatlock & Associates, 208 Elgin Street, Carlton, VIC 3053 (AU).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.

(54) Title: **PHYSICAL TRAINING SYSTEM AND APPARATUS THEREFOR**

(57) Abstract

A rack apparatus for strength training has a frame having a pair of spaced floor engaging members (3) at one end of which there can be removably attached a first pair of upwardly directed members (10), one associated with each floor engaging member (3), a further pair of upwardly directed members (4) each removably attached to one of the floor engaging members (3), the pairs of upwardly directed members (10, 4) including spaced apertures (23) therethrough to which can removably be connected further pieces of the apparatus. The further pieces of apparatus include a bench, hooks for barbells (40) and dip attachments. Safety bars (30) may be fitted between the first and further pairs of upwardly directed members so that if a barbell is dropped by a user, it is held by the safety bars. The specification also includes a strength training program which is particularly adapted for use with the rack apparatus.



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PHYSICAL TRAINING SYSTEM AND APPARATUS THEREFOR

This invention relates to an apparatus for physical training and training systems particularly adapted for use therewith and more particularly to systems which is adapted for strength exercises.

- 5 The apparatus is effectively portable so adapted to permit its use with systems whereby strength exercises can be carried out other than in a normal gymnasium environment, although it can be used in such an environment.

Strength training has a number of advantages and in particular these can include the following.

10 **Increase in functional capacity -**

Strength training can increase muscular strength, endurance and power which can enhance the ability to perform day-to-day activities such as lifting and carrying, as well as benefit many sporting or recreational pursuits.

Reduction of injury risk -

- 15 Research suggests strength training will also result in stronger connective tissue (ie. tendons and ligaments) which may aid in injury prevention. Performing weight training exercises also improves co-ordination of muscle recruitment and increases 'postural awareness' which may further enhance the efficiency and safety of performing day to day routines.

20 **Maintenance/increase of lean tissue -**

As we age our muscle mass begins to shrink. Most adults tend to lose about half a pound of muscle every year from disuse. This often results in a 'flabbier' look and feel.

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Strength training can help prevent this loss of muscle mass and often promote increases in lean tissue. It should be noted that females tend not to substantially increase muscle size due to typically low testosterone hormone levels. In fact, any increase in muscle mass from strength training in females is typically balanced by a loss of body fat, yielding no change or a slight decrease in total body weight.

Maintenance/increase of metabolic rate -

Metabolic rate typically decrease 1-3% per decade after the age of 20. This is largely due to loss of muscle mass from declining activity levels. Metabolic rate will also decline following a reduced energy (Calorie) diet. Adults who participate in a strength training programme will tend to increase, or at least maintain, their resting metabolic rate by promoting maintenance of, or increases in, lean tissue mass.

Reduction of excess body fat -

Performing strength training has a calorie cost and can also increase metabolic rate by increasing lean tissue both of which increase energy expenditure levels and promotes utilisation of excess body fat stores. Every pound of muscle added to the body burns about 35 extra calories per day, or about three to four pounds of fat every year.

Improvement in psychological well-being -

Participation in strength training enhances the self confidence and body image of both male and female participants. It is believed this is due to favourable changes in strength and body composition from such training.

Improved bone density -

The strength of bone is positively correlated with its mineral density. Sports people who are exposed to heavy loading (eg. weight lifters and throwers) have greater bone

densities than those who are not (eg. runners, soccer players and swimmers). Other studies have shown increases in bone density in response to 5-12 months of strength training for post menopausal and pre menopausal women. This is highly relevant given that women are particularly prone to the development of osteoporosis.

5 Because of all these advantages which are associated with strength exercises, strength training is becoming a popular way of exercising, but gymnasium based strength training is often perceived as intimidating by the uninitiated and particularly by the female market.

10 There have recently been proposed exercise class formats such as those known as PUMP and Power Bar which have been developed to bring the benefits of strength training out of the gym and into a more user friendly environment. Whilst these do bring strength training to a number of people who would not normally have access to it their classes are far less effective than gymnasium based strength training, because they compromise on critical issues such as progressive over load, training intensity, and rest periods, by
15 maintaining a non-stop "aerobics" class structure. This means that the programs tend to develop muscular endurance rather than strength. Strength gains in previously untrained subjects show an increase of 5 - 25% over a period of 10 - 12 weeks whereas conventional resistance training programs would bring an improvement of the order of 50 - 200% in the same time.

20 The first object of the invention is to provide an apparatus which is adapted for strength training and which is sufficiently portable to be set up and used outside the gymnasium environment to give the benefit of gymnasium based training in a non-gymnasium atmosphere, although it can fully satisfactorily be used in a gymnasium.

25 A secondary object is the use of the apparatus to provide systems of strength training which gives the benefits of gymnasium based training but which may be effected in a non gymnasium atmosphere, although the systems can be fully satisfactorily applied in a gymnasium.

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The invention includes a rack apparatus for strength training having a frame having a pair of spaced floor engaging members at one end of which there can be a first pair of upwardly directed members one associated with each floor engaging member, a further pair of upwardly directed members each associated with one of the floor engaging members, the pairs of upwardly directed members including spaced apertures therethrough to which can removeably be connected further pieces of the apparatus, and being able to be moved relative to the floor engaging members for ease of transport of the apparatus.

The rack apparatus of the invention is portable but which when assembled is sufficiently sturdy to permit use with substantial weights, and is set up so that a user is protected from the weights in normal operation.

The separate members are affixed via locking bolts which provide rigidity to the apparatus.

There may be provided a bench which can be removably located in the apparatus.

The invention also includes a strength training program which is adapted for use with the apparatus as described hereinabove, which incorporates the use of a program card system to enable the systematic rotation of core compound exercise using free weights.

In order that the invention may be more readily understood we shall first describe the apparatus in relation to the accompanying drawings which:

Figure 1 is a largely exploded view of the body of the rack apparatus;
Figure 2 shows a modified form of connection of the members 4 to the ground engaging members 3;
Figure 3 is an exploded view of a bench to be used with the apparatus, the figure also showing the form of bracket and one form of seat which can be used with the bench.

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- Figure 4 shows a modification of the connector means for the bench;
Figure 5 is a second form of seat which can be used with the bench;
Figure 6 is a still further form of seat which can be used with the bench;
Figure 7 shows forms of dip bar attachments for use with the apparatus.
5 Figure 8 is a modified form of dumbbell used with the system;
Figure 9 is a form of card which demonstrates the system.

Referring first to Figure 1 the rack comprises a base having two L-shaped members 2 the arms of which 3 and 4 are normally interconnected and, as illustrated, the connection can be by way of an angle bracket 5 which is welded to arm 3 and bolted to arm 4 to enable
10 the components to readily be shipped but, in use, would normally be assembled. We can include a further support to restrict any bending moment which can be applied to the angle bracket 5.

The arrangement of Figure 2 shows a modified form of connection between the arms 3 and 4 in which there are a pair of plates 120 connected to arm 3 which plates have a pair
15 of apertures 121, the arms being adapted to pass on either side of arm 4 which has a corresponding aperture 125 and a pivot member 126 passes through the apertures to permit the arm 4 to rotate relative to the arm 3 and to lie in a position closely adjacent its upper surface. When in the use condition, illustrated in the Figure, a bolt 122 can pass through an aperture 123 in the arm 4 and is connected to a threaded plug 124
20 located within the arm 3.

A rear member 6 can interengage with extensions 7 on the arms 3 and be held in position by clamps 8 which may pass through threaded nuts on the member 6 or into threaded apertures in the extensions 7.

There are two uprights 10 which each comprise a member 11 which has associated
25 therewith members 12 and 13 which comprise a strut and a strap or the like 14 to which the members 11 and 13 are attached. On each arm 3 there is a stop member 17 over which the lower end of the member 11 can pass and the upright 10 may simply be passed

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over this with the strap 14 lying along arm 3 or there can be a form of interconnection which necessitates the upright being placed at an angle and rotated to the position illustrated in Figure 1. Once connected, the strap 14 may have an aperture 15 which is aligned with a threaded aperture 16 in the arm 3 and a clamp 106 can be screwed therein. A further clamp 19 can pass into the rear of the member 11 and cooperate with the stop member 17.

At their upper ends the members 11 are interconnected by a cross bar 21 which may have apertures 22 which pass over extensions 20 on the members 11 and can be connected thereto by clamps 105. The rack when assembled is very stable.

The members 11 can have a number of apertures 23 therethrough and the arms 4 can have corresponding apertures 9, the apertures being adapted to receive safety bars 30. These may be provided with brackets 31 which have a returned portion 32 which can receive the arm 4 to locate the associated safety bar.

By providing a number of apertures 23 and 9, enables the safety bars to be located a number of different heights, depending on the exercise being performed.

Bar Hooks 40 which are adjacent to receive a barbell can be associated with the members 11 and these have hook members 42 to receive the barbell, as will be described further herein. The hooks 40 have an extension 43 which can enter one of the apertures 23 in the member 11 and a return 41 which can receive the member 11 to ensure positive and safe location of the hook.

When it is required, the bar hooks 40 can also be connected to the apertures 23 in the arms 4 in a similar manner.

Figure 2 shows a bench 50 which is adapted to be used with the apparatus of Figure 1 and this has a crossbar 51 having extensions 52 which are adapted to be received in bench hooks 65 which are similar in general form to the bar hooks 40, they have an

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extension 66 which can enter one of the apertures 23 in the member 11, a returned portion 67 which can be received about the member to positively locate the hook and a hook member 68 which can receive an extension 52 of the crossbar 51. The arrangement is such that there can be no axial movement of the crossbar. Connected to the crossbar
s 51 there is a bench frame 53 which, as illustrated is bolted to the crossbar, but the form of connection can be varied. To the frame 53 there can be connected to bench top 54, which may be padded.

The arrangement of Figure 4 shows a modified crossbar 98 which is cylindrical in form and uses a modified bench hook which has a member 100 which contacts the member
10 11 and a return 101 which provides a surface against which the end of the crossbar can bear and prevent axial movement of this. In this arrangement a U shaped member 99 to which the bench frame 53 connects is used to connect the frame to the crossbar.

As shown in Figure 3 a, we provide a seat assembly 60 which can comprise a seat frame 62 and a seat member and may have a pair of extensions 63 one of which passes into a
15 sleeve 55 formed on the bench frame and the other of which passes therebeneath to locate the seat at the required angle.

Figure 5 shows an alternative form of seat 70 which has a seat member 71 attached to a seat frame which includes members 72 which are adapted to enter apertures 73 in blocks 74 which are attached to the bench frame 53.

Figure 6 shows a still further form of seat which has a frame 103 which has a free arm
20 104 which is adapted to be connected into one of the sleeves 102 on the bench frame. Because of the shape of the arm 104 and the sleeves 102, the seat cannot rotate when connected.

In use, the bench 50 can take a number of positions. in each of which the extensions 52
25 are associated with bench hooks 65 which can be located in different ones of apertures 23 in members 11.

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The free end 56 of the bench can rest on the ground between the arms 3 or it can be raised to rest on a bar 57, shown in dotted line in Figure 1, which is located between apertures 58 in arms 4. This bar could be one of the safety bars 30, previously described. Depending on the selection of the apertures, the bench could be horizontal, or it could incline in either direction and its height can also be varied to thereby provide the correct working position for the exercise being effected.

If a seat is to be used, this is located to the bench frame as discussed above.

It would be possible if required to provide a bench roller attachment which can be interconnected with the main support of the bench base.

Figure 7 shows dip bars which have a connector assembly 81 which can be similar to the bar hooks 40 and are adapted to cooperate with the apertures 23 in the members 11. The bars have two components 83 and 84 which are preferably integral and component 84 has a hand piece 85 associated therewith. These bars can be connected on either side of the members 11 and can act as a support whilst dipping movements are effected by the user of the apparatus. It will be noted that the apparatus is such that lunges can be made in the confines of the apparatus which is a valuable feature. The use of the dip bars is usually associated with a movement along the length of the apparatus.

The hooks 82 associated with the connector assemblies 81 for the dip bars can be used as an alternative to bench hooks 65 to support the bench.

Figure 8 shows a dumbbell which is particularly suitable for use with the systems of the invention, and comprises a bar 91 which includes a handle portion 92 and fixed weights 93. If required, the fixed weights may be provided with a collar 94 and grub screw 95 so that their value can be varied.

The aspect of the invention which is of importance is the concept of readily removable and replacement adjustable weights 96 which can be placed over the bar 91 and as

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illustrated held in position by a spring collar 97. When using dumbbells, it can be valuable to add adjustable microweights to these as these can enable more effective incremental loading for training than has generally been available.

Whilst it has been known to provide dumbbells which can have variable weights, these
5 have normally been very slow to place onto the dumbbell or to remove therefrom and as such it has been considered by many people hardly worthwhile, whereas the benefits they can get from minor changes can be quite substantial.

In the invention and particularly for those people who have not done a great deal of weight training we can colour code the weights for the barbells and the dumbbells so that
10 these people can adjust their weights according to a colour system rather than physically examining the weights for actual values.

In use, in general terms, the rack can be assembled and if the bench is being used the pins 66 of the bench hooks 65 are located in the required apertures 23 and, by rotation the returns 67 engage the members 11. The bench crossbar 51 is located at the required
15 height. The safety bar 30 is passed through the required aperture 58 and the bench is located into the required configuration.

If the frame is to be used for exercises which do not require the bench then this is removed, the safety bars 30 are fitted if required and bar hooks 40 can be located in required apertures 23 of members 11. The weights to be used can then be positioned on
20 the bar hooks 40 and the necessary exercises effected and it will be appreciated that the user is protected from inadvertent dropping of the weights by the safety bars 30 located below his or her body.

It will be seen from the foregoing that we can provide a very versatile frame and bench arrangement which can be useful for various forms of weight training.

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It is also to be appreciated that variations can be made to the rack and the bench for various applications.

The rack and bench are designed for use with a training programme which we have developed which may be built around:

- 5 1. **Barbell Squats** - performed as per a conventional power/squat rack. The safety bars 30 of the apparatus allow heavy loads to be lifted safely. The barbell is supported on the adjustable bar hooks 40.
2. **Barbell Lunges** - unlike conventional power racks the apparatus has a deep safety cage, which allows heavy lunges to be performed in safely.
- 10 3. **Chin-ups** - the top supporting cross bar 21 doubles as a chin-up bar.
4. **Dips** - it can be that dip bar attachments 80 illustrated in Figure 7 are inserted in apertures 23 of member 11 at the appropriate height. It will be seen that the attachments are formed in a manner similar to the bar hooks and the bench hooks and are positively located once fitted.
- 15 5. **Bench Pulls** - are performed by lying prone on the bench and pulling the barbell which is positioned on bar hooks 40 which are inserted in apertures 23 in members 11 at the appropriate height below the bench, upwards to the bench. Dumbbells can also be used.
- 20 6. **Bench Press** - the bench is mounted low within the rack to allow bench press to be performed whilst maintaining trunk stability. Bar hooks 40 are adjusted to suit individual arm lengths. Dumbbells can also be used in this exercise.

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7. **Incline Bench Press** - positioning the bench on an angle (approx 30°) and fitting the bench seat 60 allows incline bench press to be performed. Dumbbells can also be used.
8. **Incline Abdominals** - the bench is adjusted to progressively increase the angle and therefore the difficulty of the trunk stabilisation exercises. A variety of exercises can be performed depending on individual strength. A barbell is placed on the bar hooks 40 in an aperture 23 of the members 11 to provide a handhold.
9. **Shoulder Press** - standing shoulder press is performed within the safety area with safety bars 30 in place. Military Press, Behind Neck Press and Push Press can be performed.
10. **Pull-Ups** - by placing the barbell across bar hooks 40 at a suitable height modified chin-ups can be performed. Alternatively, a safety bar 30 can be passed through apertures 58 of the arm members 4 to carry out this exercise.

The system uses cards, one of which is illustrated in Figure 9. for each of the types of exercises and if required we could have two different programmes one of which could be used on say, Saturday, Sunday, Monday and Tuesday and the other for the remainder of the week. The system is adapted for use with groups of persons (although it can be used individually) and each programme could have six major exercises which are broken down into three groups of two. In a class participants are divided into two groups each of which rotate around the first two exercises and then proceed to the second group of exercises, which are once again rotated and then to the third group of exercises which are again rotated.

The number of repetitions used by each group will depend on the strength of the members of the group, relative to the training programme and could if required be different for different members of the group if there are more advanced students in the group.

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When working in groups the participants work in pairs with one exercising whilst the other rests and assists should this be necessary.

Especially prepared music can be used to guide when and for how long participants exercise and rest. The music may also provide guidance as to the speed at which the exercise is performed.

The system can also provide other forms of exercise, for example trunk exercises and Figure 9 is a chart illustrating one form of trunk exercise.

Basically the trunk exercises are broken down into four sections:

1. Trunk Stabilisation (Transverse Abdominis);
- 10 2. Trunk Flexion (Rectus Abdominis);
3. Trunk Extension (Erector Spinae);
4. Trunk Rotation (Obliques);

and each of these has several 'exercise progressions' some of which are for use with the apparatus of the invention, some of which require no additional apparatus. Figure 9 is an exemplification being Chart 3 of the Trunk Flexion group. It can be seen that this chart, and all other charts, progress through the exercise with beginner, intermediate and advanced levels. The diagrams indicate how the exercise is to be carried out and the degree of difficulty and equipment to be used is indicated as are the preferred number of repetitions depending upon how the student is progressing.

20 Tables

The attached tables provide an indication of the system to be used with the apparatus of the invention and are basically to be used for the instructor or trainer to develop a training regime for particular individuals or groups.

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It will be seen that the system of the invention provides a system of strength training which can be carried out readily at any required location and is adapted for use with groups of students who may be of effectively the same level or can be of different levels, it provides a structured arrangement which ensures maximum benefit to the students and
5 a paced teaching arrangement which ensures that the students work within their capabilities whilst strength is being developed.

It is of course to be understood that the actual arrangement of the system can be varied to provide specific results or to provide an alternative exercise programme. All such variations together with variations in the rack and bench are deemed to be part of the
10 invention.

The Workout:

Warm Up - Client own

Routine

1. Legs (stretch)

2. Chest/Shoulder (stretch)

3. Upper Back (stretch)

4. Abdominal

5. Lower Back

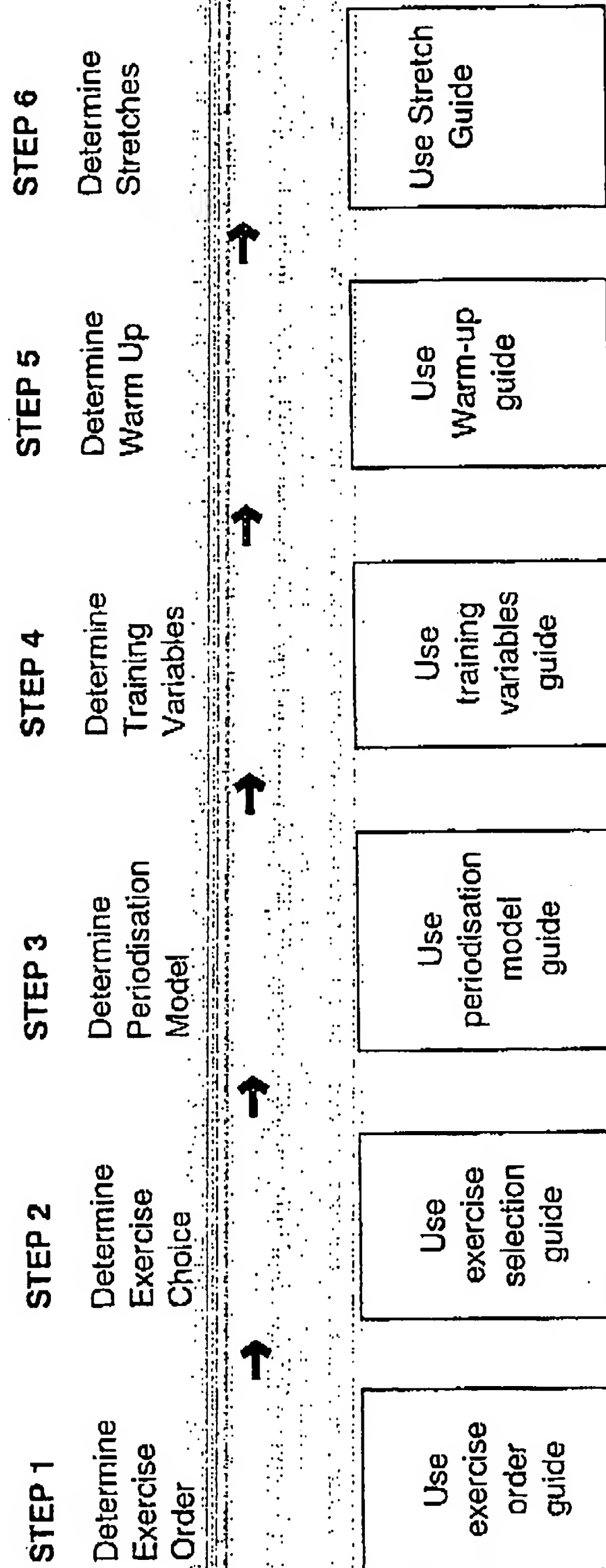
CORE Any order

SUPPLEMENTARY
(Super-sets)

Cool Down

3 stretches & optional neck/shoulder massage

Trainer Programming Guide



STEP 1: Exercise Order Guide

Choose one option from CORE and one from SUPPLEMENTARY

CORE EXERCISE ORDER

A.	B.	C.	D.	E.	F.
1. LEGS	1. LEGS	1. BACK	1. BACK	1. CHEST/ SHOULDER	1. CHEST/ SHOULDER
2. BACK	2. CHEST/ SHOULDER	2. CHEST/ SHOULDER	2. LEGS	2. LEGS	2. BACK
3. CHEST/ SHOULDER	3. BACK	3. LEGS	3. CHEST/ SHOULDER	3. BACK	3. LEGS

AND

SUPPLEMENTARY EXERCISE ORDER

A.	B.
4. ABS	4. LWR BACK
5. LWR BACK	5. ABS

STEP 2: Exercise Selection Guide (Core Exercises)

Choose one exercise from each CORE exercise group

1. Legs

Squats

(back, front, regular, wide, narrow,
single leg)

Step Ups

Static Lunge

Dynamic Lunge (as above)

2. Chest/Shoulder

Chest

Push Ups

Bench Press (SB, DB, BB, Alt.)

Incline Press (SB, DB, BB, Alt.)

Shoulder

Dips

Shoulder Press

(DB, BB, Alt, Seated, SB, Push Press -

DB & BB)

Shrugs (DB, BB, Power)

3. Upper Back

Bench Pulls (BB, DB)

One Arm Row (DB, SB)

Chins (u/h, o/h)

Pull Ups (underhand, overhand)

Bent Over Row

STEP 2: Exercise Selection Guide (Supplementary Exercises)

Choose one exercise from each SUPPLEMENTARY exercise group

1. Abdominals 2. Lower Back

Trunk Stabilisation

Prone Bracing (#1, #2)

Supine Bracing (#1, #2)

Hanging Bracing

Trunk Extension

Bridging (#1, #2)

Back Extension

Hip Extension

Deadlifts

Trunk Flexion

Crunches

Ab. Curls

Sit Ups

Reverse Curls

Trunk Rotation

Oblique Curls

Lateral Flexion

Hip Rolls etc

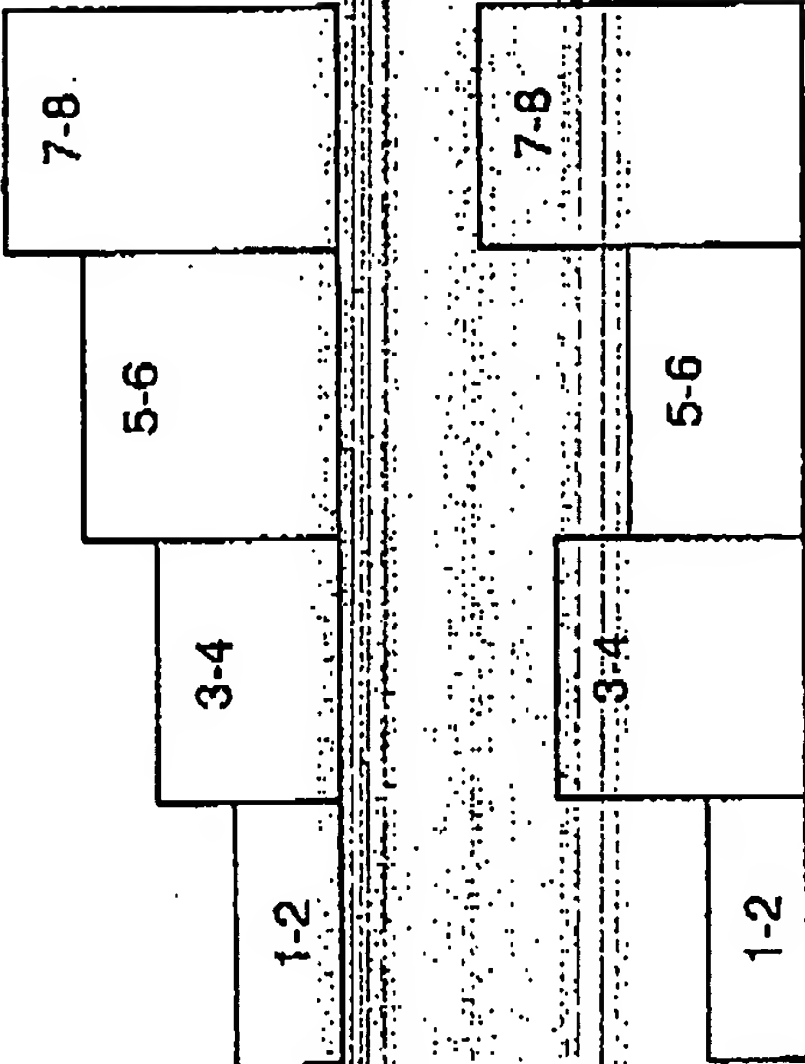
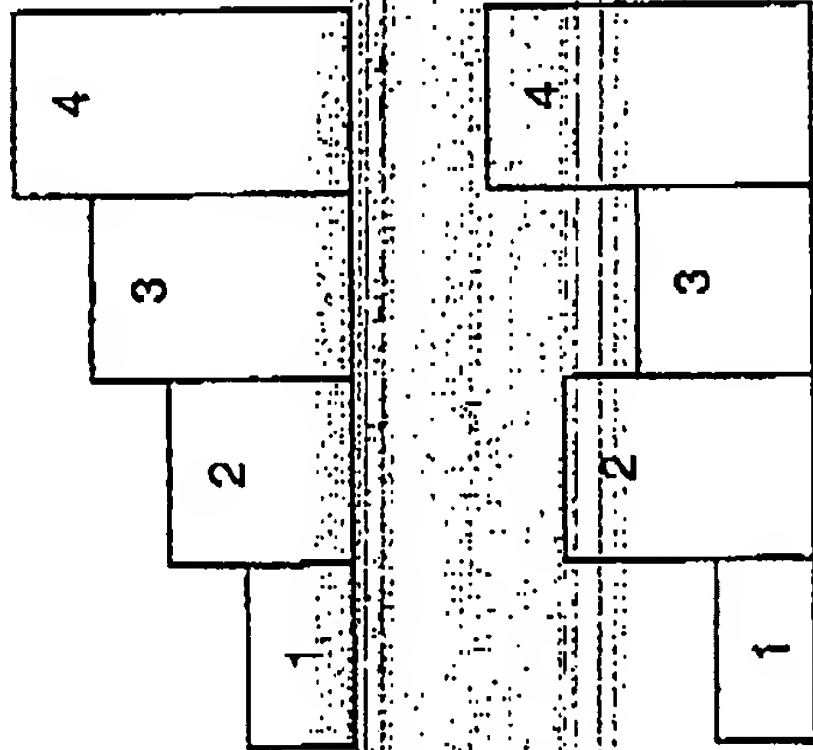
STEP 3: Periodisation Model Guide

Choose one of the following periodisation models:

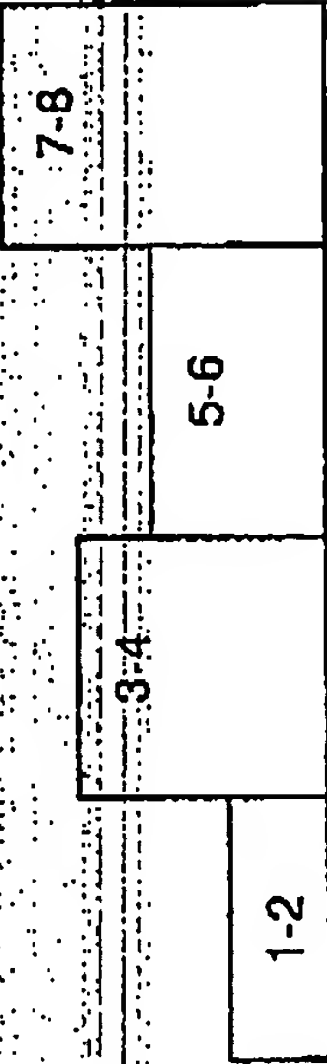
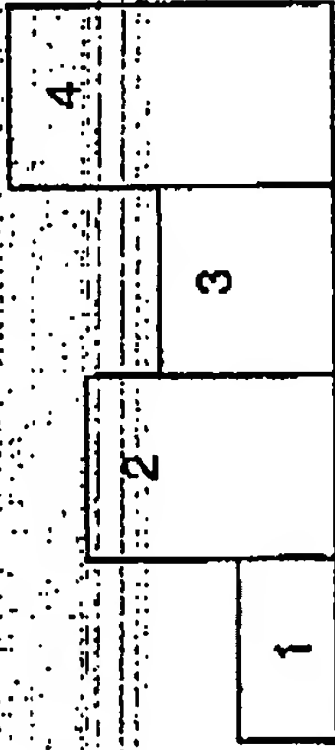
One Program Cycle
(weekly variation)

Two Program cycle
(fortnightly variation)

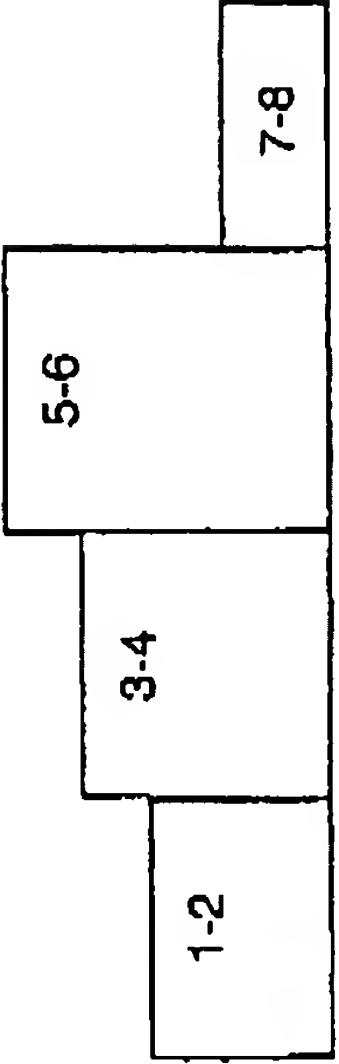
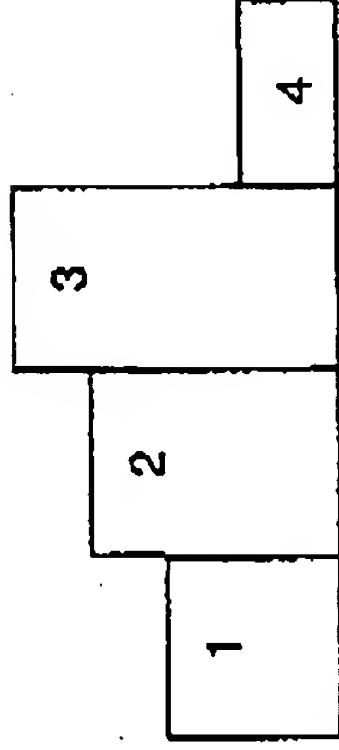
1. LINEAR

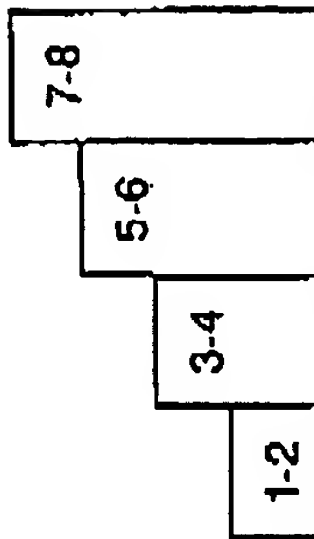


2. UNDULATING



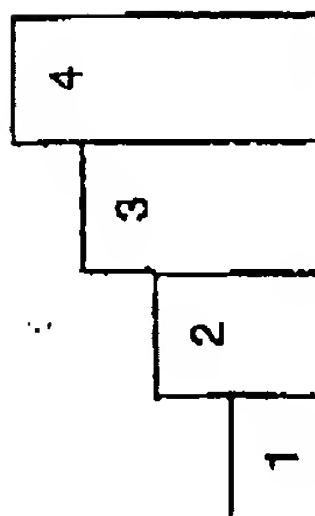
3. WAVE LIKE





STEP 4: Training Variables Guide

1. LINEAR PERIODISATION



A.

Week	1(1-2)	2(3-4)	3(5-6)	4(7-8)
Volume	2 x 13-14	2 x 11-12	2 x 9-10	2 x 7-8
Rest	30, 45 or 60 sec	45, 60 or 75 sec	60, 75 or 90 sec	75, 90 or 105 sec
Temp	201, 301, 111, 211, 202	201, 301, 111, 211, 202, 302, 212	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313

Substitute Sheet

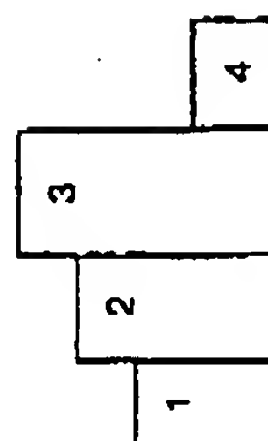
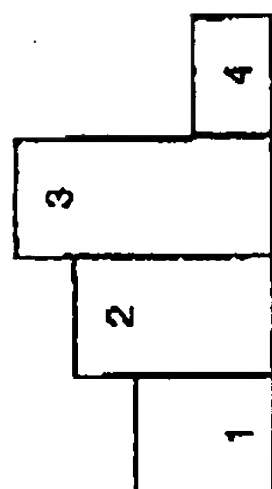
C.

Week	1(1-2)	2(3-4)	3(5-6)	4(7-8)
Volume	2 x 9-10	2 x 7-8	2 x 5-6	2 x 3-4
Rest	60, 75 or 90 sec	75, 90 or 105 sec	105 or 120 sec	120 sec
Temp	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 403, 503, 603, 703, 213, 313, 413, 513, 613, 404, 504, 604, 704, 804, 414, 514, 505	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 403, 503, 603, 703, 803, 213, 313, 413, 513, 613, 713, 813, 404, 504, 604, 704, 804, 414, 514, 614, 714, 814, 505, 605, 705, 805, 515, 615, 715, 815, 606, 706, 806, 816, 716, 816

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PC 11/09/000001

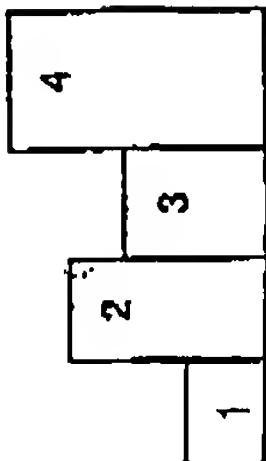
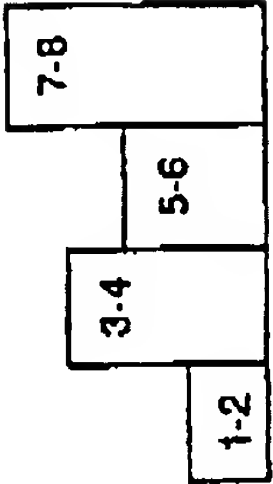
STEP 4: Training Variables Guide 3. WAVE LIKE PERIODISATION



A.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 11-12	2 x 9-10	2 x 7-8
Rest	45, 60 or 75 sec	60, 75 or 90 sec	75, 90 or 105 sec
Temp	201, 301, 111, 211, 202, 302, 212	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313
B.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 10-11	2 x 8-9	2 x 6-7
Rest	45, 60 or 75 sec	60, 75 or 90 sec	75, 90 or 105 sec
Temp	201, 301, 111, 211, 202, 302, 212	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313
C.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 9-10	2 x 6-7	2 x 4-5
Rest	60, 75 or 90 sec	75, 90 or 105 sec	105 or 120 sec
Temp	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 504
D.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 8-9	2 x 5-6	2 x 3-4
Rest	60, 75 or 90 sec	105 or 120 sec	120 sec
Temp	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 504, 514, 505	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 504, 514, 505, 605, 705, 606, 616, 716, 816

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STEP 4: Training Variables Guide 2. UNDULATING PERIODISATION



A.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 14-15	2 x 10-11	2 x 12-13
Rest	30, 45 or 60 sec	45, 60 or 75 sec	30, 45 or 60 sec
Temp	201, 301, 111, 211, 202	201, 301, 111, 211, 202, 302, 212	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213
B.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 13-14	2 x 9-10	2 x 11-12
Rest	30, 45 or 60 sec	60, 75 or 90 sec	45, 60 or 75 sec
Temp	201, 301, 111, 211, 202	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213
C.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 10-11	2 x 6-7	2 x 8-9
Rest	45, 60 or 75 sec	75, 90 or 105 sec	60, 75 or 90 sec
Temp	201, 301, 111, 211, 202, 212	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 403, 503, 603, 703, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 505
D.			
Week	1(1-2)	2(3-4)	3(5-6)
Volume	2 x 9-10	2 x 5-6	2 x 7-8
Rest	60, 75 or 90 sec	105 or 120 sec	75, 90 or 105 sec
Temp	201, 301, 111, 211, 202, 302, 402, 212, 312, 303, 213	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 505	201, 301, 111, 211, 202, 302, 402, 212, 312, 412, 303, 403, 503, 603, 703, 213, 313, 413, 513, 613, 404, 504, 604, 414, 514, 505, 605, 705, 805, 515, 615, 715, 815, 606, 706, 806, 616, 716, 816

STEP 5: Warm-up Guide

Choose one of the following Warm-up options:

A.

BIKE (Time)
Manual/Varied/Hill/Interval
Time: 5-10 minutes
WL/HR: _____
STRETCH: (optional) _____

B.

BIKE (Distance)
Manual/Varied/Hill/Interval
Distance: 2-5 km
WL/HR: _____
STRETCH: (optional) _____

C.

STEPPER (Time)
Manual/Random/Hill
Time: 5-10 minutes
WL/HR: _____
STRETCH: (optional) _____

D.

STEPPER (Floors)
Manual/Random/Hill
Floors: 50-100
WL/HR: _____
STRETCH: (optional) _____

E.

ROWER (Time)
Time: 5-10 minutes
WL/HR: _____
STRETCH: (optional) _____

F.

ROWER (Distance)
Distance: 1000-2000 km
WL/HR: _____
STRETCH: (optional) _____

G.

TREADMILL (Time)
Manual/Random/Hill
Time: 5-10 minutes
Speed/HR: _____
STRETCH: (optional) _____

H.

TREADMILL (Distance)
Manual/Random/Hill
Distance: 1-2.5km
Speed/HR: _____
STRETCH: (optional) _____

STEP 6: Stretch Guide

Choose one of the following Warm-up options:

- | | | | |
|------|---------------------|------|-------|
| A. | B. | C. | D. |
| LEGS | CHEST/
SHOULDERS | BACK | OTHER |

Gluteals

Supine Gluteal	Upper Back	Triceps
Supine Piriformis	SB Lat	Overhead Tricep
Quadriceps	Chest	Biceps
Prone Quadricep	Lower Back	Pole Bicep
Prone Quad/Hip Flexor	SB Supine Chest	

Hamstrings

- Supine Hamstring
(peroneal, diagonal, rotate)

Adductors

- Seated Groin (short)
- Supine Groin (long)

Calves

- Prone Quad., Gastroc, Soleus &
Achilles

Shoulders

- Straight Arm
- Bent Arm

Abdominals

- Cobra

Traps./Neck

- Bench Trapezius

We claim

1. A rack apparatus for strength training having a frame having a pair of spaced floor engaging members at one end of which there can be a first pair of upwardly directed members one associated with each floor engaging member, a further pair of upwardly directed members each associated with one of the floor engaging members, the pairs of upwardly directed members including spaced apertures therethrough to which can removeably be connected further pieces of the apparatus, and being able to be moved relative to the floor engaging members for ease of transport of the apparatus.
2. A rack apparatus as claimed in claim 1 wherein at least one of the pairs of the upwardly directed members are removeably attached to the associated floor engaging members.
3. A rack apparatus as claimed in claim 1 wherein at least one of the pairs of upwardly directed members are hingedly connected to the associated floor engaging members.
4. A rack apparatus as claimed in any one of claims 1 to 3 wherein each of the first pair of upwardly directed members includes an extension the lower end of which is spaced from the lower end of the member and terminates in the same horizontal plane as the lower end of the member and abuts the floor engaging member to provide stability to the first pair of upwardly directed members.
5. A rack apparatus as claimed in any one of claims 1 to 4 wherein the first pair of upwardly directed members extend further upwardly than the further pair of upwardly directed members.

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6. A rack apparatus as claimed in any one of claims 1 to 6 wherein the first pair of upwardly directed members are adapted to be interconnected at their upper ends, the connection being by means of a rod which serves both to stabilise the apparatus and which is adapted for use as a horizontal bar.
- 5 7. A rack apparatus as claimed in claim 6 wherein the rod inter engages with the upwardly directed members and is attached thereto when the apparatus is to be used.
8. A rack apparatus as claimed in any preceding claim wherein the spaced apertures include apertures which are coaxial in the first pair of members and the other members and through which can pass safety bars which provide a limit to
10 downward movement of weights located there across or being used thereabove.
9. A rack apparatus as claimed in any preceding claim wherein brackets can removeably be connected to the apertures in the first pair of upwardly directed members to receive or retain further components of the apparatus or devices to
15 be used therewith.
10. A rack apparatus as claimed in claim 9 having a bench which can be connected at one end to the brackets.
11. A rack apparatus as claimed in claim 10 wherein the bench is rotatable about the connection to the brackets to be able to adopt different angles.
- 20 12. A rack apparatus as claimed in claim 11 wherein the other end of the bench can rest on the ground between the floor engaging members.

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13. A rack apparatus as claimed in claim 11 wherein the bench can be supported at the other end by resting on a member located transversely between the members of the further pair of upwardly directed members.
14. A rack apparatus as claimed in any one of claims 10 to 13 wherein the bench has a removable seat associated therewith.
15. A rack apparatus as claimed in claim 9 wherein the brackets are formed to act as a support for a barbell.
16. A rack apparatus as claimed in claim 9 wherein the brackets includes a dip attachment associated with each of the upwardly directed members.
17. A rack apparatus as claimed in any one of claims 9 to 16 wherein the brackets are connected by a quick release means.
18. A rack apparatus as claimed in any preceding claim wherein the space between the pairs of upwardly directed members is sufficient to permit lunging exercises therein.
19. A dumbbell comprising a body having extensions to which weights are adapted to be connected; first weights attached to the dumbbell one each side of the hand piece thereof, and positively located onto a shaft of the dumbbell and movable weights adapted to be placed over the shaft and to be removably held thereon.
20. A dumbbell as claimed in claim 19 wherein the fixed weights are held in position by a screw or the like passing through a collar and locking onto the shaft of the dumbbell.

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21. A dumbbell as claimed in either claim 19 or claim 20 wherein the adjustable weights are held in position by a spring collar.

22. A strength training program for use with the apparatus of any one of claims 1 to 21 which incorporates the use of a program card system to enable the systematic rotation of exercises.

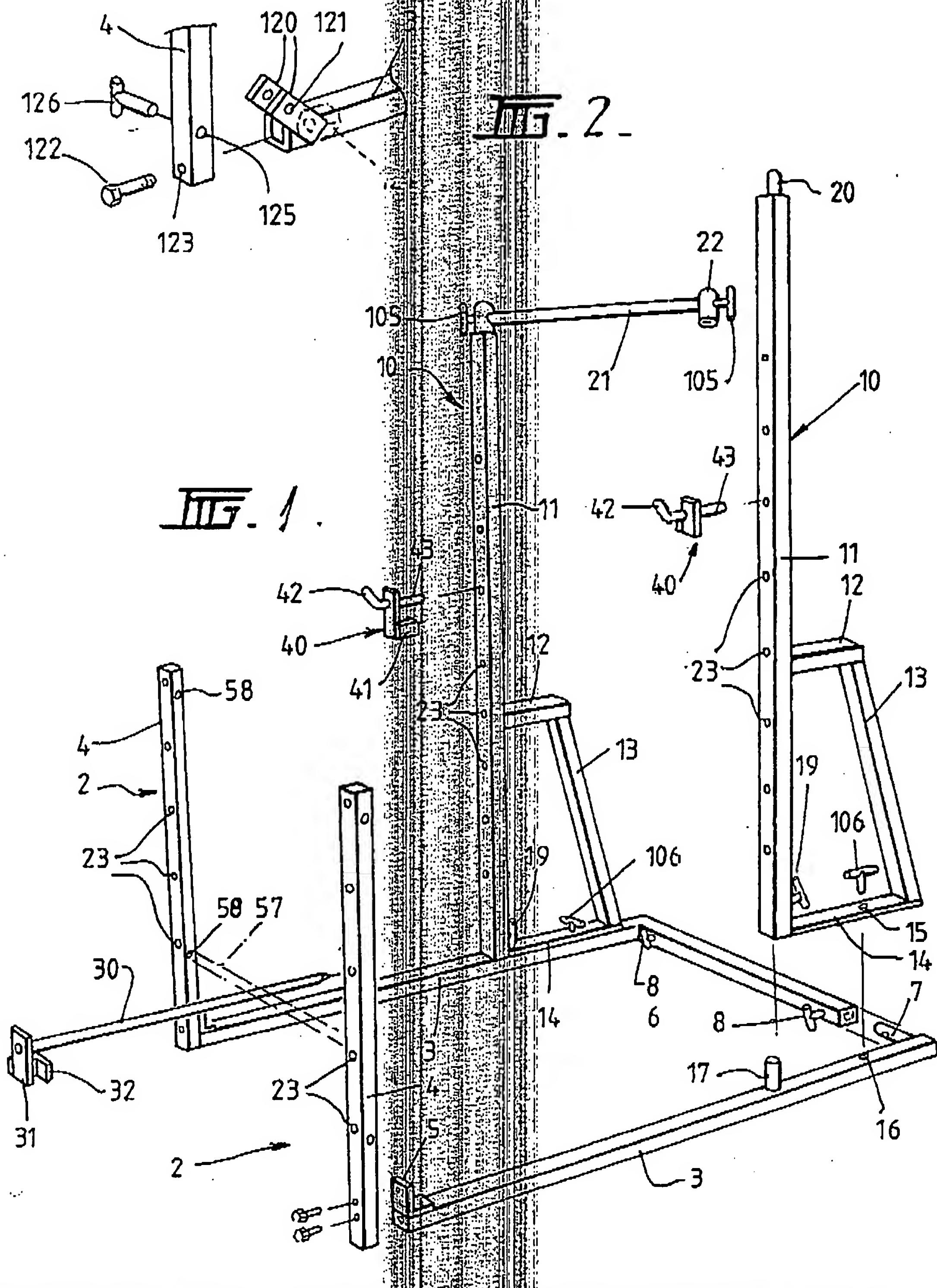
23. A strength training program as claimed in claim 22 in which there are specific exercises for the legs, the chest and shoulders, and the upper back.

24. A strength training program as claimed in claim 23 where there are additional exercises for the abdomen and the lower back.

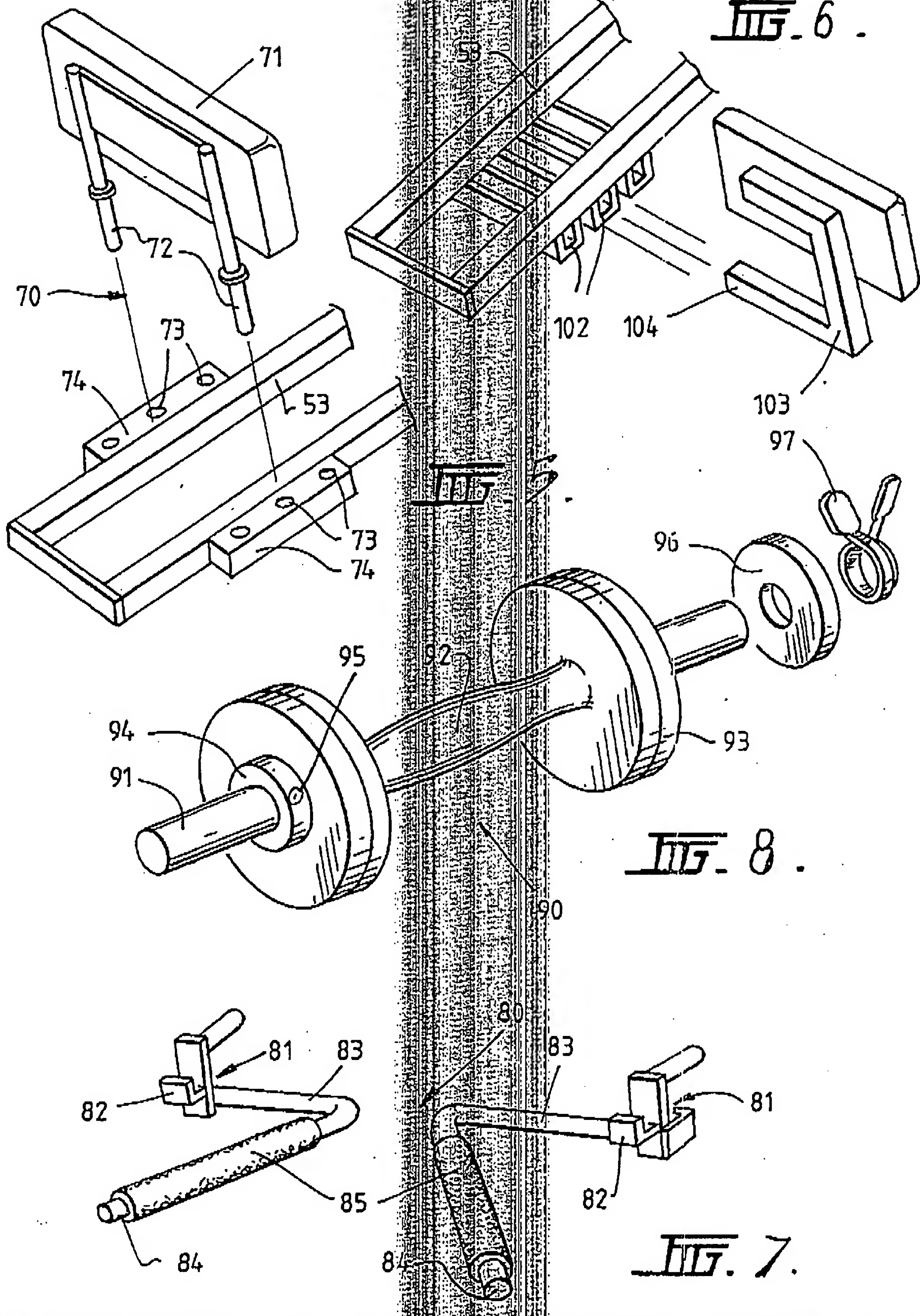
25. A strength training program as claimed in one of claims 22 to 24 wherein there is a program card for each type of exercise which can include a number of different versions of the exercise, each one being more taxing than the previous one.

26. A strength training program as claimed in any one of claims 22 wherein the program is developed on the basis of the table set out herein.

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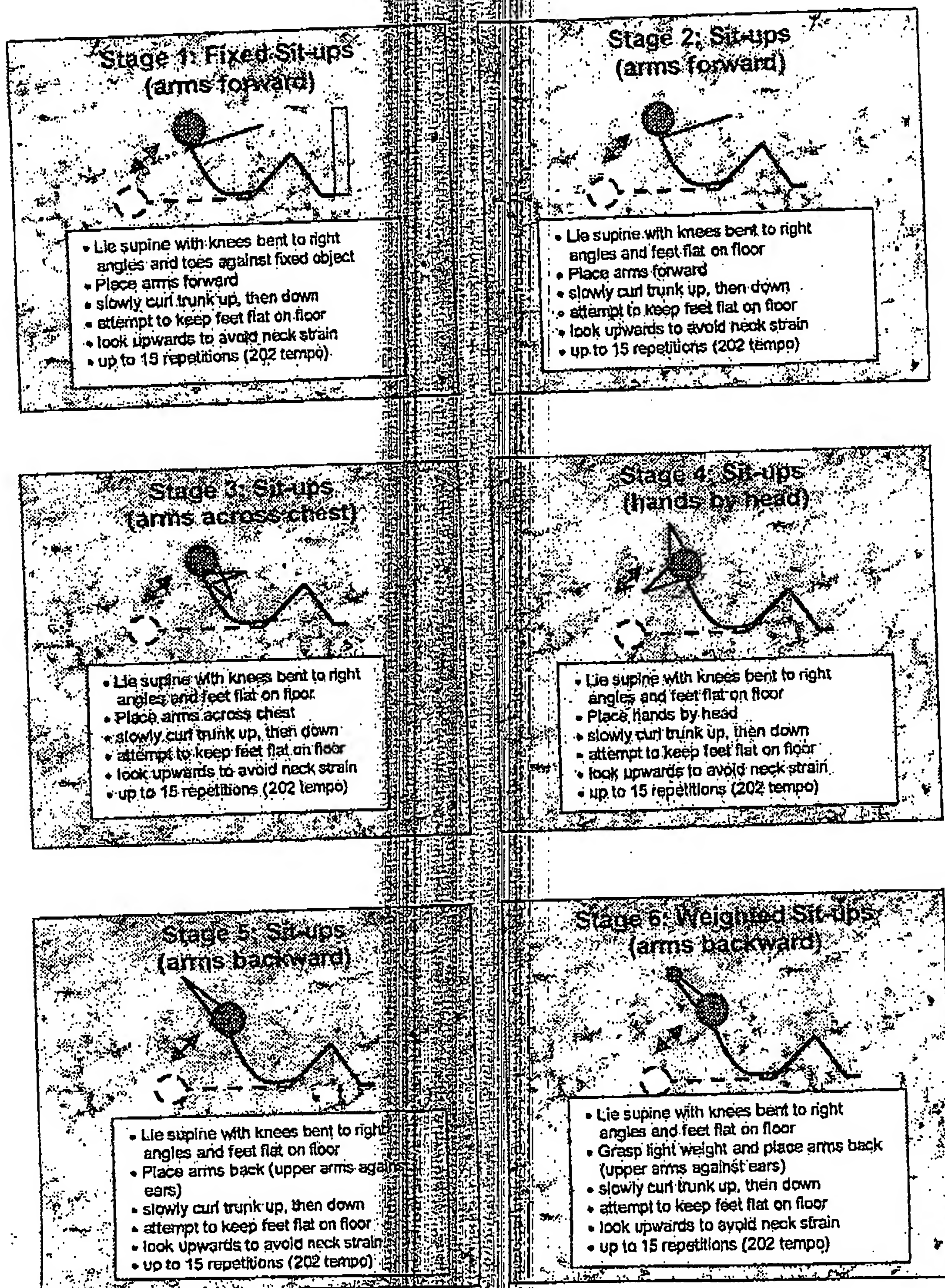


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Figure 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00431

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁶ : A63B 21/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC: A63B 21/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4257590 A (SULLIVAN et al) 23 March 1981	1 - 18, 22- 26
X	US 4527797 A (SLADE, Jr et al) 9 July 1985	1 - 18, 22- 26
X	US 4955604 A (POGUE) 11 September 1990	1 - 18, 22- 26
<input type="checkbox"/> Further documents are listed in the continuation of Box C		<input type="checkbox"/> See patent family annex
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claims or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>		
Date of the actual completion of the international search 12 July 1999		Date of mailing of the international search report 14 JUL 1999
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer J.W. THOMSON Telephone No.: (02) 6283 2214

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00431

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

There are two inventions. Claims 1 to 18 relate to a rack apparatus. Claims 19 to 21 define dumbbells. These groups of claims define separate unrelated apparatus with no common special technical feature.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1 to 18 and 22 to 26 when appended to those claims

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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